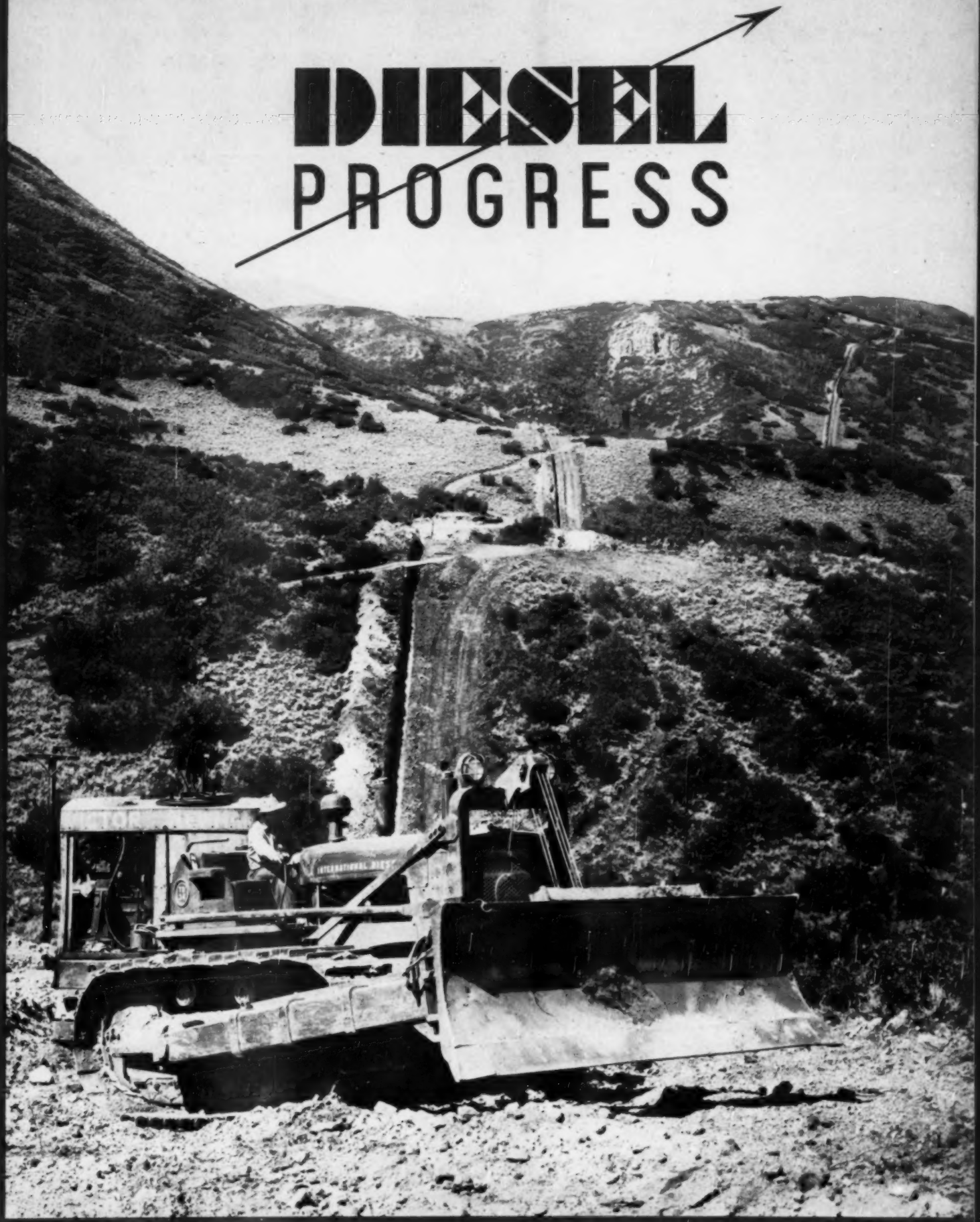
DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



FIVE DOLLARS PER YEAR

JUNE, 1950

FIFTY CENTS PER COPY

DIESEL PROGRESS, for June, 1950, Volume XVI, Number 6. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 816 No. La Cienega Blvd., Los Angeles 46, Calif. Rex W. Wadman, President. Subscription rates, $5 per year, single copy 50c. Acceptance under 34.64, P. L. & R., authorized.

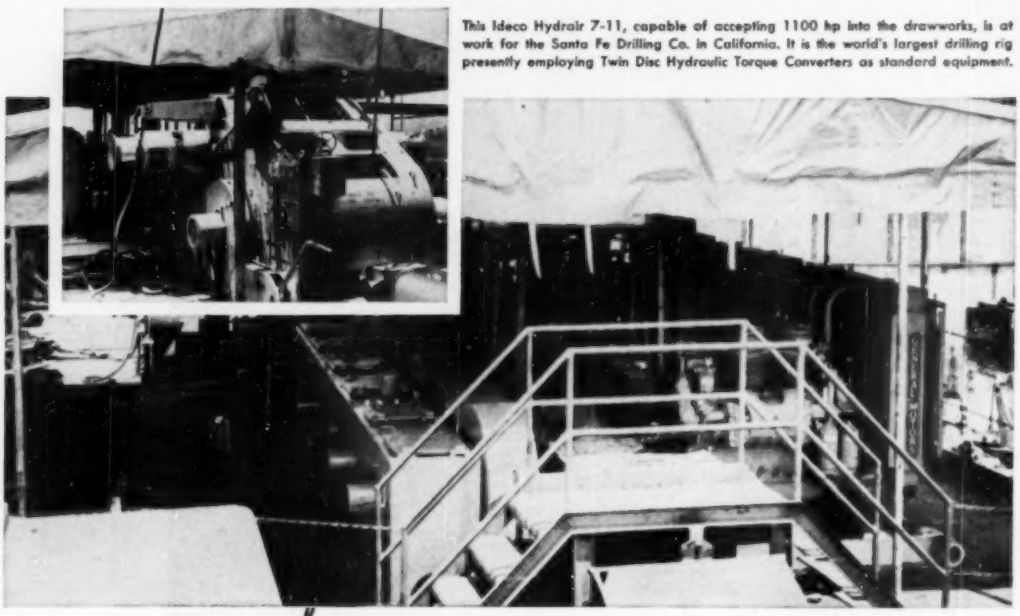
Standard on the *Big* Rigs

On this big new Ideco Hydrair 7-11 drilling rig, designed to go 11,000 feet, power is transmitted from the three twin GM Diesel engines to the compound through Twin Disc Torque Converters.

This fluid transmission absorbs every shock load. It eliminates all gear shift guesswork within the high-speed and low-speed range because it automatically adjusts output speed ratios to meet changing load requirements.

Capable of multiplying engine torque more than five times at stall, the Twin Disc Torque Converter gives maximum speed for raising the empty block . . . maximum pull for coming out of the hole—without throttling or shifting gears.

Just as Twin Disc Torque Converters are becoming standard on smaller rigs, so, too, are these three-stage converters becoming standard on the deep-well rigs . . . because records prove that with them you can drill more hole faster, with less wear and tear on the equipment, at lower cost. Twin Disc Hydraulic Torque Converters (Lysholm-Smith type) are available in capacities from 40 hp to 1,000 hp. For complete information, write today for Bulletin No. 135-C.



This Ideco Hydrair 7-11, capable of accepting 1100 hp into the drawworks, is at work for the Santa Fe Drilling Co. in California. It is the world's largest drilling rig presently employing Twin Disc Hydraulic Torque Converters as standard equipment.

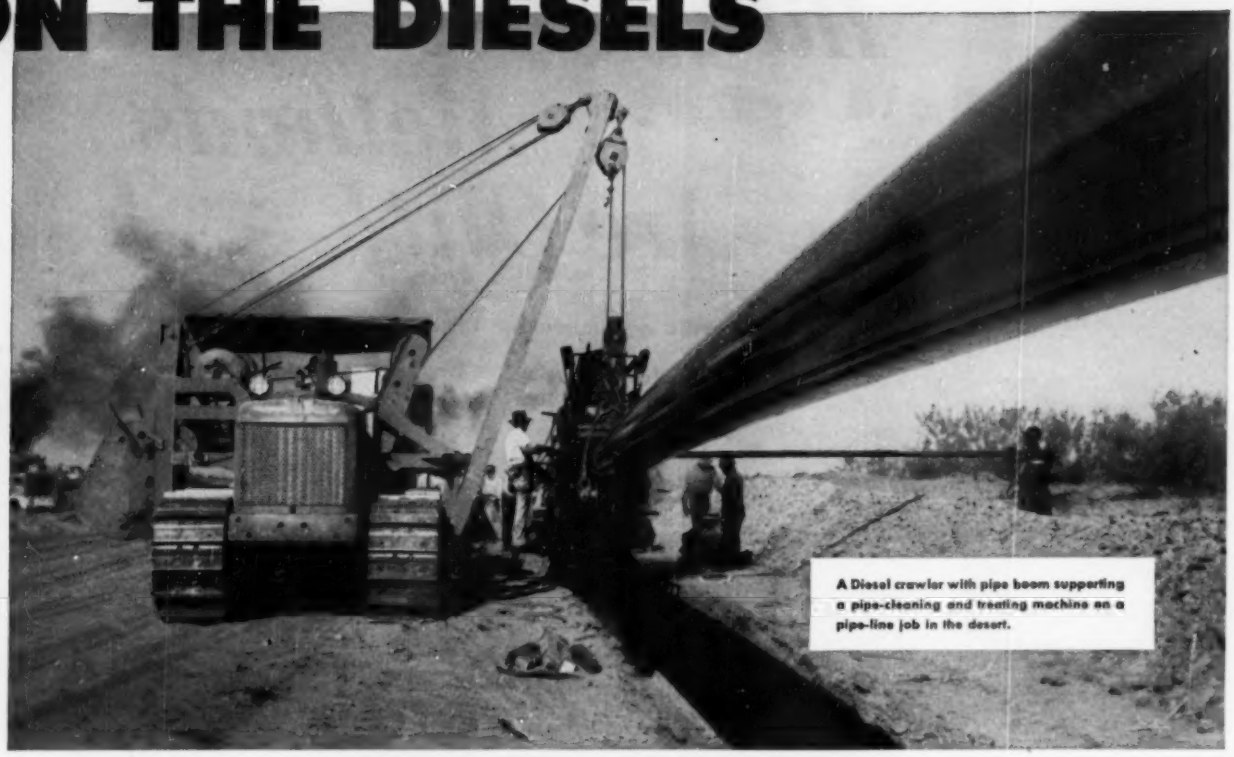
TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

Clutches & Hydraulic Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCH OFFICES: CLEVELAND • DALLAS • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

DELCO-REMY
ON THE DIESELS



A Diesel crawler with pipe boom supporting a pipe-cleaning and treating machine on a pipe-line job in the desert.

DIESELS ON THE JOB

Laying pipe in the desert is a tough job . . . a job that calls for plenty of dependable power and the dependable performance of all component parts of the equipment.

For many years Delco-Remy has worked hand-in-hand with the makers of all types of Diesel-powered machines, supplying them with electrical units designed and built especially for the job.

Manufacturers and users alike know the name Delco-Remy — they know that it stands for the highest standards of performance in electrical equipment.

UNITED SERVICE MOTORS

DELCO-REMY—A UNITED MOTORS LINE
Service Parts and Delco Batteries
Available Everywhere, Through
UNITED MOTORS DISTRIBUTORS

Delco-Remy
DIVISION, GENERAL MOTORS CORPORATION
ANDERSON, INDIANA

DELCO-REMY • WHEREVER WHEELS TURN OR PROPELLERS SPIN

Developed by three years of research . . . and now refined by tens of millions of dollars' worth of new equipment!

Gulf's GREAT NEW No-Nox

DESIGNED FOR TODAY'S POWERFUL NEW ENGINES!

Today's new cars have the most powerful *engines* ever made. AND—

They require a super, anti-knock gasoline.

Such a gasoline is the *new* No-Nox. It was especially designed by Gulf scientists—working hand-in-hand with leading automotive engineers—to give you *maximum* performance in your new car.

With a gasoline like this great new No-Nox, you can be *sure* your new car will perform at its brilliant best.

And the new No-Nox not only gives *new* cars peak performance. It also gives new life, new pep, and stops knocks in older cars too — even many with heavily carboned engines!

So no matter what model you drive, get a tankful of the *new* No-Nox today.

See for *yourself* what a difference it makes!

Whisper-Quiet, Knock-Free Power!
Easy, Fast-Firing Starts!
Quick, Safe Passing!
Unexcelled Mileage!
Terrific Power in Every Drop!

Good Gulf—our famous "regular" gasoline —is now better than ever, too!

Gulf Oil Corporation • Gulf Refining Company

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT R.P.M. Delo Oil R.R.

UNIT Locomotive Diesel EMD 567

SERVICE Freight haul over mountains

PERIOD 4 years

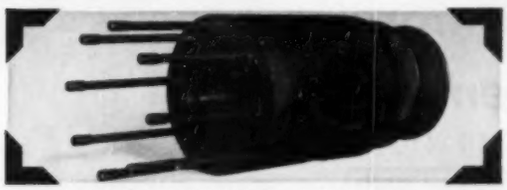
LOCATION Auburn, Wash. Livingston, Mont.

FIRM Northern Pacific Railway

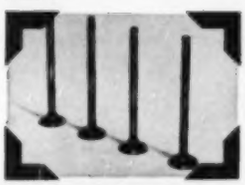
Engine parts still in use after 4 years freight service!

RPM DELO OIL R.R. IN THIS LOCOMOTIVE'S ENGINES during four years of mountain freight service, held wear down so low that after each progressive-maintenance inspection the cylinder-assembly parts were put back to work.

IN SERVICE 490,013 MILES, this piston indicates the excellent condition of all parts as they came from the engines. Note the absence of lacquer deposits and that all rings are free. A special detergent in RPM DELO R.R. keeps contaminants harmlessly dispersed in the oil.



481,384 MILES OF SERVICE from this liner during 4 years caused only 0.005" wear, 0.001" taper.

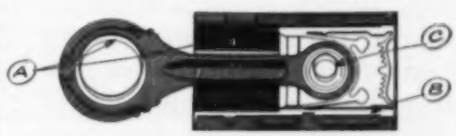


CON ROD BEARINGS, CARRIER AND WRISTPIN BUSHINGS at the end of four years were in "perfect" condition as this picture shows. Mileage on these parts is 481,384.

NO VALVE TROUBLE of any kind was encountered. Mileage on these valves, 200,000 since servicing cylinder head.

RPM DELO LUBRICATING OILS

How RPM DELO Oil R. R. prevents wear, corrosion, oxidation



A. Special additive provides metal-adhesion qualities...keeps oil on parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean...helps prevent scuffing of cylinder walls and valve blows.

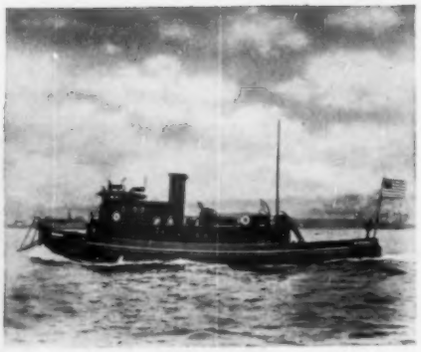
C. Special compounds stop corrosion of any bushing or bearing metals and foaming in crankcase.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA • San Francisco
THE CALIFORNIA OIL COMPANY • Barber, N.J., Chicago, New Orleans
STANDARD OIL COMPANY OF TEXAS • El Paso, Texas
THE CALIFORNIA COMPANY • Denver, Colorado

DETROIT

FORT WAYNE



WICOMICO

TOLEDO

DIESEL-ELECTRIC MARINE DRIVE

COLUMBUS

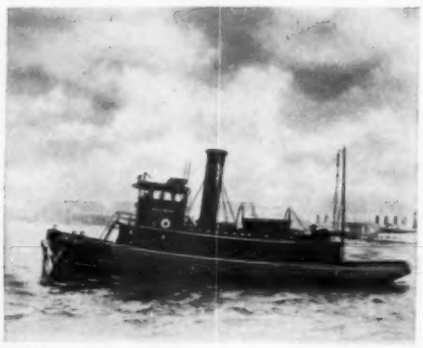
in Railroad Service for more than a Quarter of a Century

LONG before Diesel-Electric trains were used in this country, the Pennsylvania Railroad Company recognized the advantages inherent in this type of drive for marine propulsion. The seven Diesel-Electric tugs illustrated, owned and operated by the Pennsylvania, were powered by Winton Engine Company, predecessor of Cleveland Diesel Engine Division of General Motors, starting with the *Detroit* in 1924. Over the years, Diesel-Electric Marine Drive has proved its worth all around the world.

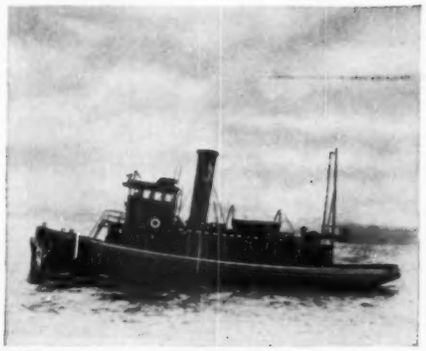
GM
GENERAL MOTORS
DIESEL POWER

ENGINES FROM 150 TO 2000 H. P.

General Motors Diesel-Electric Drive has powered more than 700 vessels in 22 different classifications.



GREENSBURG



ELMIRA

** Leader in Diesel engineering development for 38 years*

Cleveland Diesel Engine Division

CLEVELAND 11, OHIO

GENERAL MOTORS

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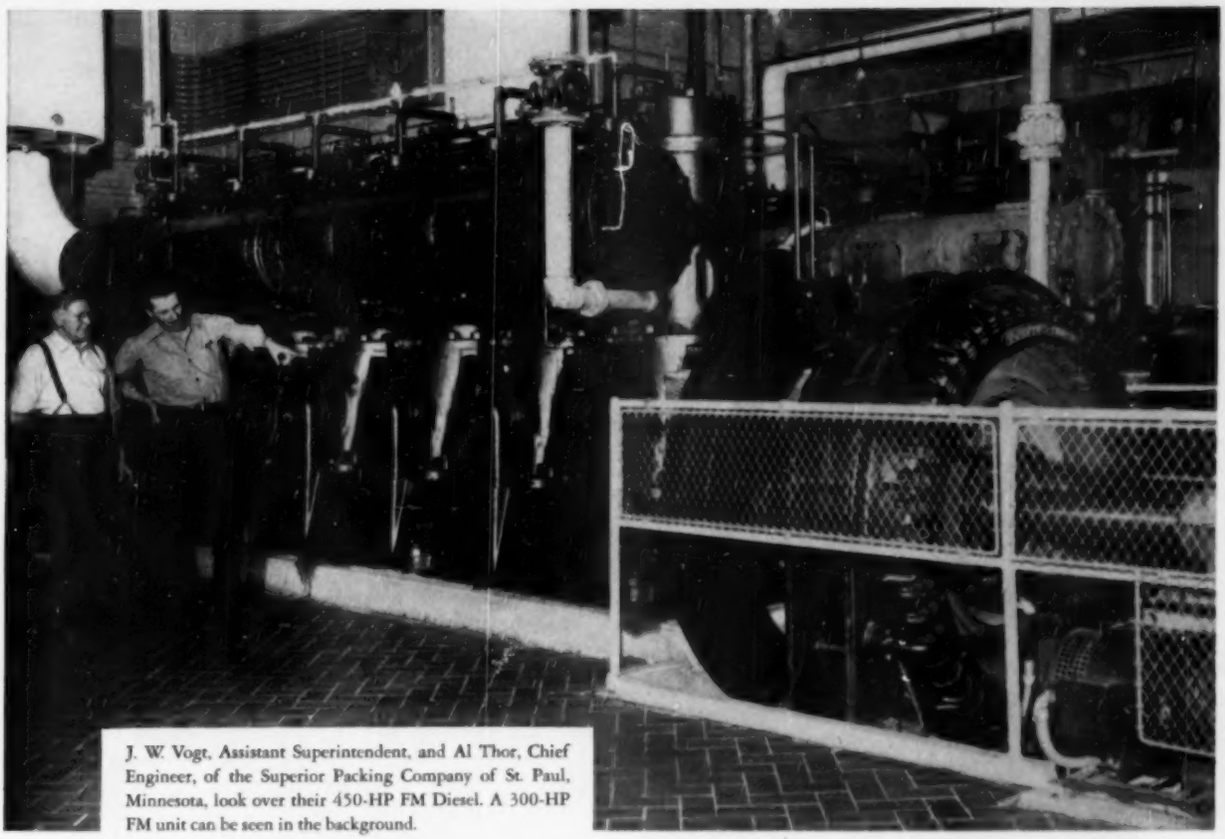


J. W. Vogt, Assistant Superintendent, and Al Thor, Chief Engineer, of the Superior Packing Company of St. Paul, Minnesota, look over their 450-HP FM Diesel. A 300-HP FM unit can be seen in the background.

How they lightened load troubles . . .

A 300-HP FM Diesel was hard pressed to meet growing power demands of the Superior Packing Company, St. Paul, Minnesota. The punishing operation began to take its toll in engine deposits, stuck rings, and excessive wear.

The troubles persisted despite the use of various conventional and detergent-type lubricants. Then operators took the advice of a Standard Oil lubrication specialist and switched the engine to STANDARD HD Diesel Oil, a truly heavy-duty lubricant with effective detergent qualities and high oxidation resistance.

It worked! Ring sticking and deposit troubles were eliminated. Wear was kept to a minimum. *There were no maintenance troubles despite continuous hard service.* When a new 450-HP FM Diesel was subsequently installed, operators gave the lubrication job to STANDARD HD Diesel Oil.

The same STANDARD HD qualities that stopped troubles in this heavily loaded engine can help you improve Diesel economy in any type of service. A trial will prove it. To help you make still other savings, Standard Oil has a specially trained and experienced lubrication specialist located near your plant. His headquarters are the nearest Standard Oil (Indiana) office. Phone him there or write to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD HD
TRADE MARK
Diesel Oil

STANDARD OIL COMPANY (INDIANA) STANDARD

Cycoils always bat in the "Clean up" spot

WHEREVER there's a big investment at stake, the job of dust protection is invariably left to dependable Cycoil* Oil Bath Air Cleaners. At this Odessa, Texas TXL gasoline plant, 44 Cycoils are placed in the "clean up" spots at the air intakes for 22 Clark Brothers engines.

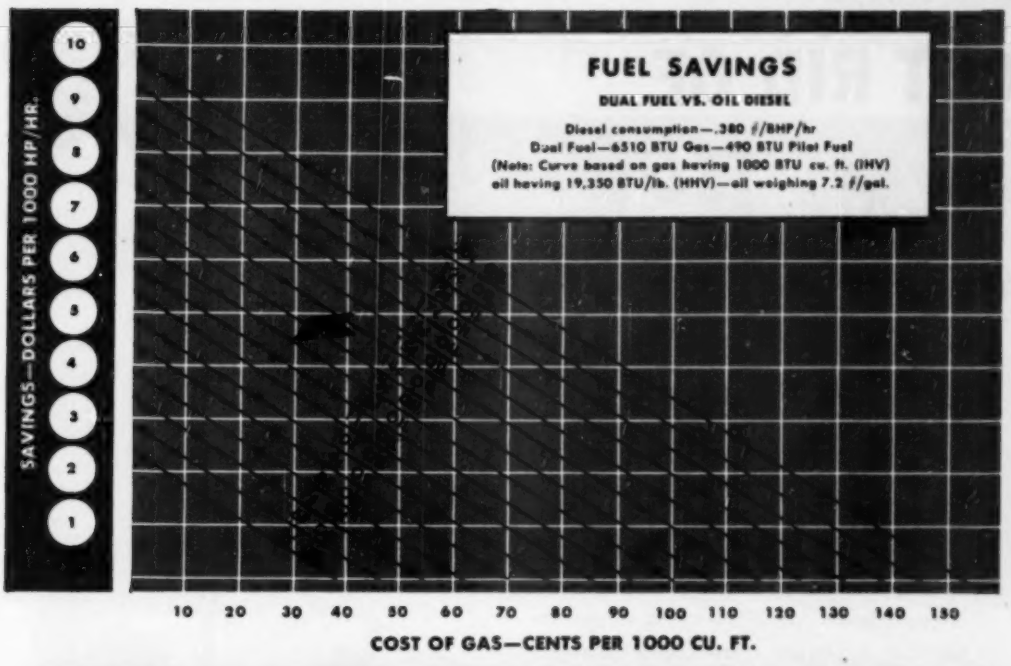
Cycoil goes all out in its battle against dust. Even before the air reaches the filter pads, over 90% of its fine dust content is trapped by the oil bath action. When you add positive oil circulation for continuing self-cleaning action, plus the added filtration supplied by the filter pads, the net result is approximately 100% clean air.

If you want to give your engines or compressors complete, continuous protection put Cycoils in the "clean up" spot. They have never failed to deliver a winning performance against dust. For complete information, write for Bulletin 130-D.

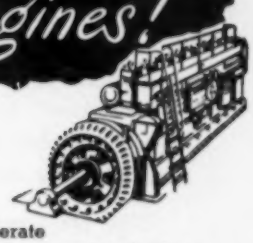
AMERICAN AIR FILTER COMPANY, INC.
408 Central Avenue, Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

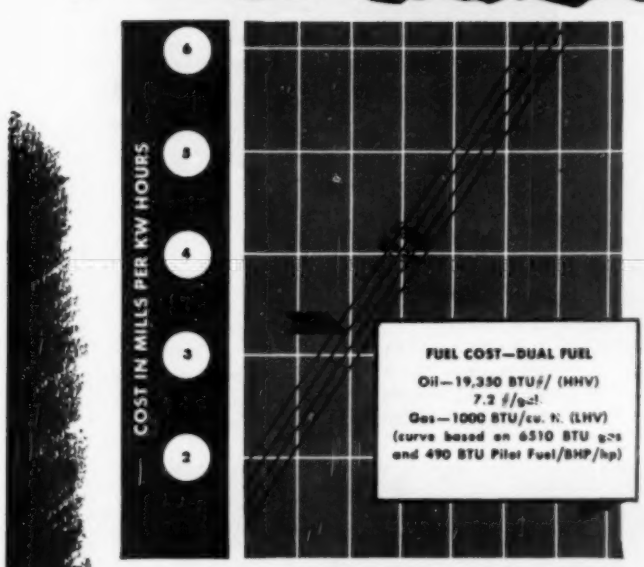
** Oil bath air cleaner*

AAF Cycoil OIL BATH AIR CLEANER
AND INTAKE SILENCER



..See how much you can save with FAIRBANKS-MORSE Dual Fuel Engines!





Your Fairbanks-Morse Diesel installation can operate still more profitably if you are situated where natural or sewage gas is available. For instance, the chart above shows typical fuel savings possible. As an example, say your gas costs 30 cents per 1000 cubic feet and your oil costs 13 cents per gallon—savings per day would be $108.00! Or, as shown at left, if gas costs 30 cents and diesel oil is 15 cents, your fuel cost would be down to 3.2 mills per kw-h! Figure the savings based on fuel costs or purchased power costs in your area, and then get in touch with our nearest branch office. Fairbanks, Morse & Co., Chicago 5, Illinois.

FAIRBANKS-MORSE.

a name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS
GENERATORS • STOKERS • RAILROAD MOTOR CARS and STANDPIPES
FARM EQUIPMENT • MAGNETOS

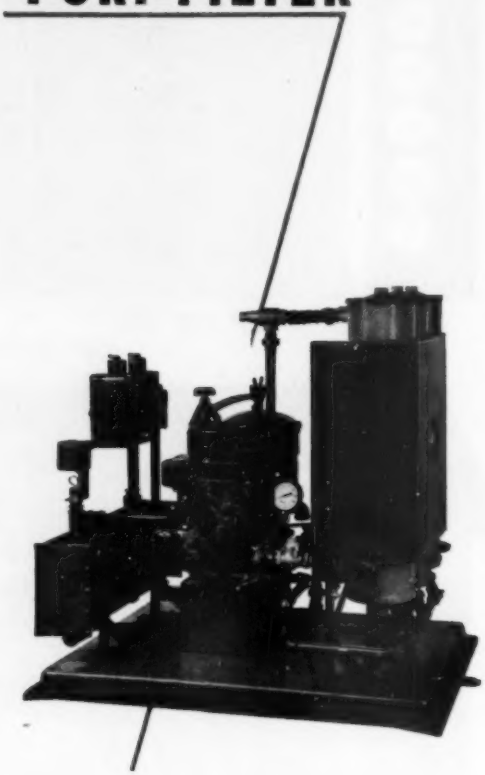
GET RID OF *GUMS, SLUDGES and COKING*

with the DE LAVAL "PURI-FILTER"

The materials in Diesel lubricating oil that cause ring sticking, sludging and "coking" can readily be removed by the De Laval "Puri-Filter." The "Puri-Filter" consists of a De Laval Centrifugal Oil Purifier in combination with Fram filters. The action of centrifugal force and filtration is so powerful that it readily frees Diesel lubricating oil of these solids that cause trouble.

While it is true that many detergent oils enable such solids to remain in suspension, the "Puri-Filter" provides a simple, sure way of eliminating these impurities as fast as they form. The "Puri-Filter" is the finest means ever discovered for keeping Diesel lubricating oil ***really*** clean, and, of course, dry.

The De Laval "Puri-Filter" is surprisingly economical to operate. The centrifuge takes out such a large percentage of all impurities that cartridges in the filters need be replaced at relatively infrequent intervals.



THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 6 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

DE LAVAL *Oil Purifiers*

FOR DIESEL LUBRICATING OIL

FOR DEPENDABILITY AND OPERATING ECONOMY

Evidence of the dependable performance of Bendix-Scintilla fuel injection equipment is furnished by the ever growing list of distinguished railroads using this equipment. On switchers or deluxe streamliners operating schedules must be maintained consistently and economically.

Bendix-Scintilla is proud of the increasingly important part its fuel injection equipment is playing in helping to maintain today's high standard of railroad efficiency. And for the future, the resources of Bendix-Scintilla are dedicated to meeting tomorrow's transportation problems.

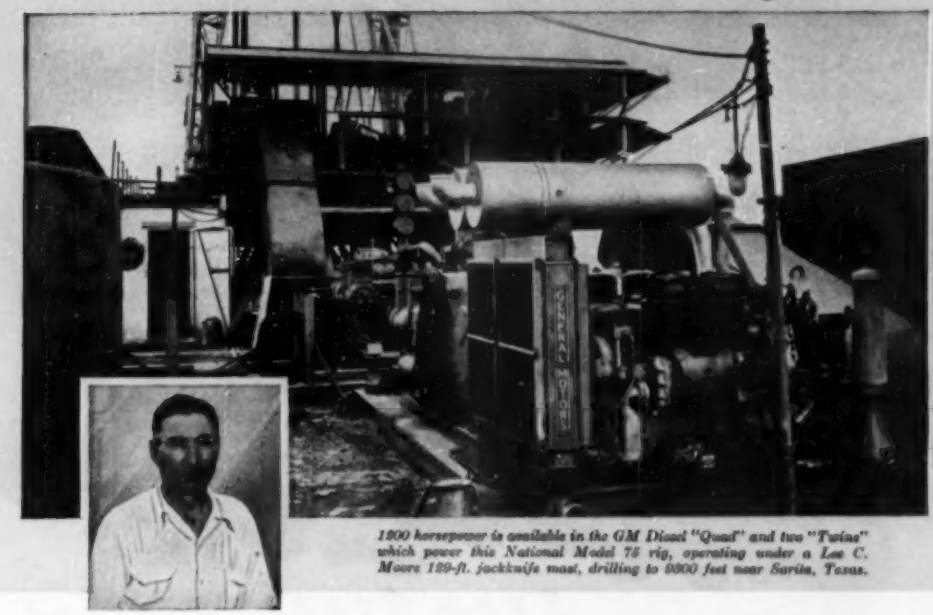
BENDIX SCINTILLA

SCINTILLA MAGNETO DIVISION OF
SIDNEY, NEW YORK
Western States Office, 582 Market Street, San Francisco 4, California
Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

Bendix AVIATION CORPORATION

"This Rig has Everything"

says Charles D. Bryant
Allen & Morris Drilling Co.



1800 horsepower is available in the GM Diesel "Quad" and two "Twins" which power this National Model 75 rig, operating under a Lee C. Moore 129-ft. jackknife mast, drilling to 9300 feet near Sarita, Texas.

POWERFUL enough to go to 11,000 feet, yet economical enough to be used on 5000- to 6000-foot contracts, this unitized rig used by Allen & Morris Drilling Company, San Antonio, Texas, has everything it takes for fast, profitable drilling. Its power — a General Motors Diesel "Quad" and two "Twins."

Mr. Chas. D. Bryant, manager at Corpus Christi, tells us they can tear down, move a reasonable distance, rig up and spud in a new hole within 18 working hours.

That points up the feature of this flexible, dependable, 2-cycle Diesel power.

Here is plenty of power in fewer units that weigh less and take less space. That means lower-cost moves, quicker setups, faster round trips, more hole drilled in less time.

All this explains why so many drilling contractors have come to rely on General Motors Series 71 Diesels. You have everything to gain by investigating this modern power. Write or phone for complete details.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

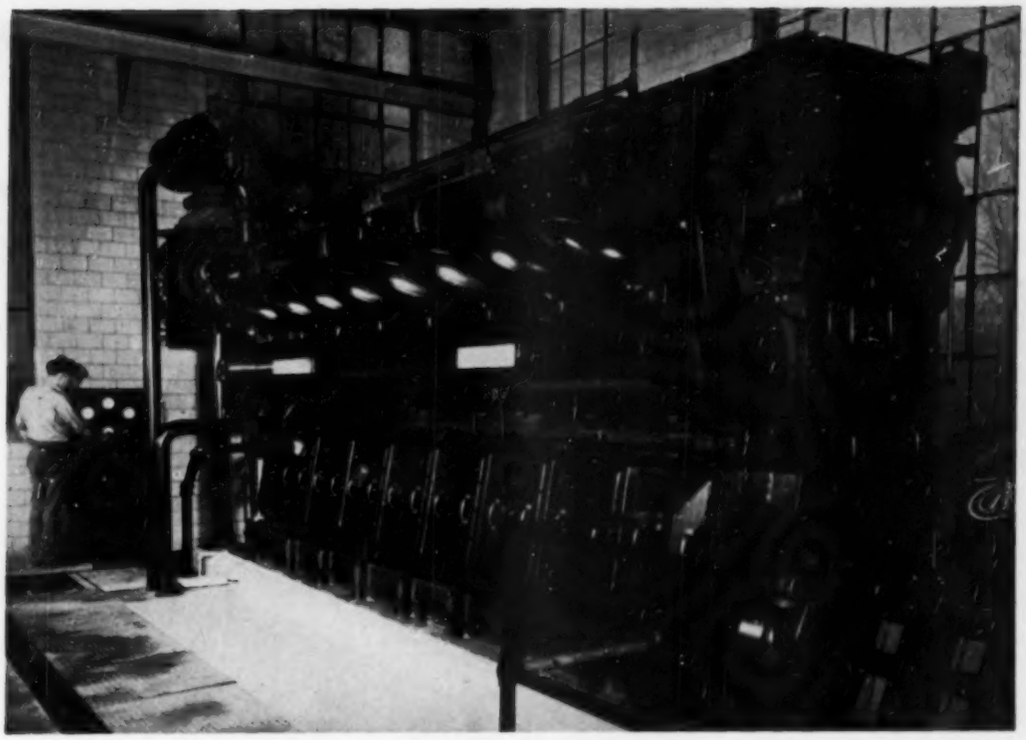
Complete Control ....

FROM START -- TO FINISH

THE basic ingredients going into your orders for diesel crankshafts, drive shafts, and connecting rods, or steel castings are constantly under the watchful eyes of intelligent and experienced metallurgists, engineers and craftsmen. Each production operation is originated, supervised and completely finished within our plant here at Erie Forge Company.

What are the results? Finished products upon which you can fully depend to do their work like the thorobreds they are. More than merely meeting specifications, Erie Forge Products set the pace for excellence of performance in service . . . for profitable returns on your investment. Let us consult with you . . . each of us will profit.

ERIE FORGE COMPANY, ERIE, PA.



FROM RED TO BLACK IN A HURRY

● Soaring costs and rising peak demands caused an Ohio generating plant to operate in the red. The management decided to do something about it—and they did.

They looked over the engine field . . . bought a supercharged Superior Diesel . . . and put it to work. After installation, over-all plant capacity was stepped-up almost 17% per gallon of fuel oil. This Model 80 Superior Engine also produced more BHP per gallon of lube oil . . . more than doubling the economy experienced in previous operations. The profit and loss statement changed from red to over $34,000 in the black in just ten months.

If you are looking for ways to cut power costs, chances are that a Superior representative can supply the answer. Why not have him explain how Superior pushes operating costs down? Or, if you prefer, write for our fully illustrated, 20-page booklet.

THE NATIONAL SUPPLY COMPANY
SUPERIOR ENGINE DIVISION
Plant and General Sales Office: Springfield, Ohio

THE NATIONAL SUPPLY COMPANY NSCO

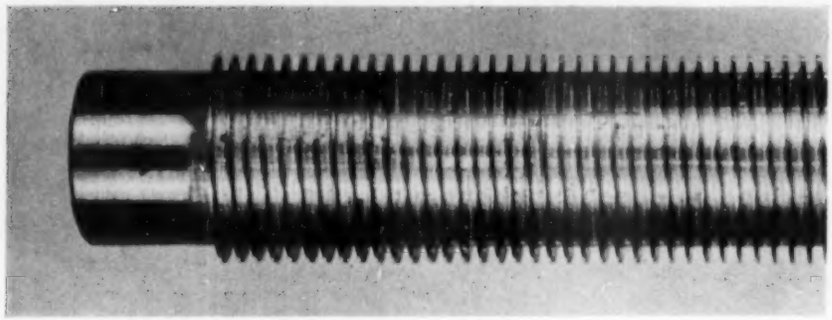
Superior DIESELS

Locomotive-Marine-Oil Field-Stationary

Why the LK-FIN Exchanger

is more effective... more compact... more economical

for lube oil and jacket water cooling



When cooling apparatus was first applied to Diesel engine lube oil and jacket water more than 50 years ago, the coolers were of the traditional type . . . a bundle of conventional bare tubes within a shell. That was the only kind of cooler known in those days.

But since then, many major improvements have been made in heat transfer apparatus. One of the most important of these developments has been FINNED heat transfer surface . . . that is, tubes with fins attached to the outside. These fins greatly increase the external heat transfer surface, thereby permitting a considerably shorter tube to perform the same cooling effect that requires a much longer bare tube.

Griscom-Russell has pioneered in the development of finned type heat transfer equipment for almost 20 years. Now Diesel engine users can have the benefit of this development as applied to lube oil and jacket water coolers.

The result . . . more effective heat transfer because of the finned tubes . . . a more compact cooler because of the more effective heat transfer surface . . . a more economical unit because of the shorter tubes and shell.

The LK-FIN Cooler has many additional advantages, too. The tubes are free to expand and contract. An outside packed gland at the floating end permits detection and elimination of leakage. Tube interiors are readily accessible at the stationary end without disconnecting piping. The coolers are built as stock units for quick shipment in any quantity.

Complete description, specifications and prices will be sent without obligation.

THE GRISCOM-RUSSELL CO., 285 Madison Ave., New York 17, N. Y.

GRISCOM-RUSSELL

PIONEERS IN HEAT TRANSFER APPARATUS

The International Diesel Crawler, pictured above, has Purolator Oil Filters as original equipment.

There's engine trouble in a dust cloud . . .

That cloud of dust is loaded with engine-wrecking abrasives ready to creep into the Diesel's oil stream. Unless the operator wants to face repair bills and costly layups . . . he had better be sure this stuff is filtered out in a hurry.

Here—and under any rugged operating conditions—you can rely on a Purolator Micronic Oil Filter for a complete filtering job!*

Why? Because Purolator's Micronic* element traps even abrasives measured in microns (.000039 of an inch) . . . has a revolutionary accordion-pleated design which provides a filtering area up to 10 times that of old-style oil filters.

For fuel oil filtration, this means the complete job so vital because of close tolerances of injector plungers, and the microscopic size of injector tip orifices. And for lube oil filtration, Purolator's greater efficiency assures less wear on hard-working bearings and other vital parts.

We know that Purolators can solve your filtering problem. Let our engineering staff show you how!

*Reg. U. S. Pat. Off.

PUROLATOR PRODUCTS INC.

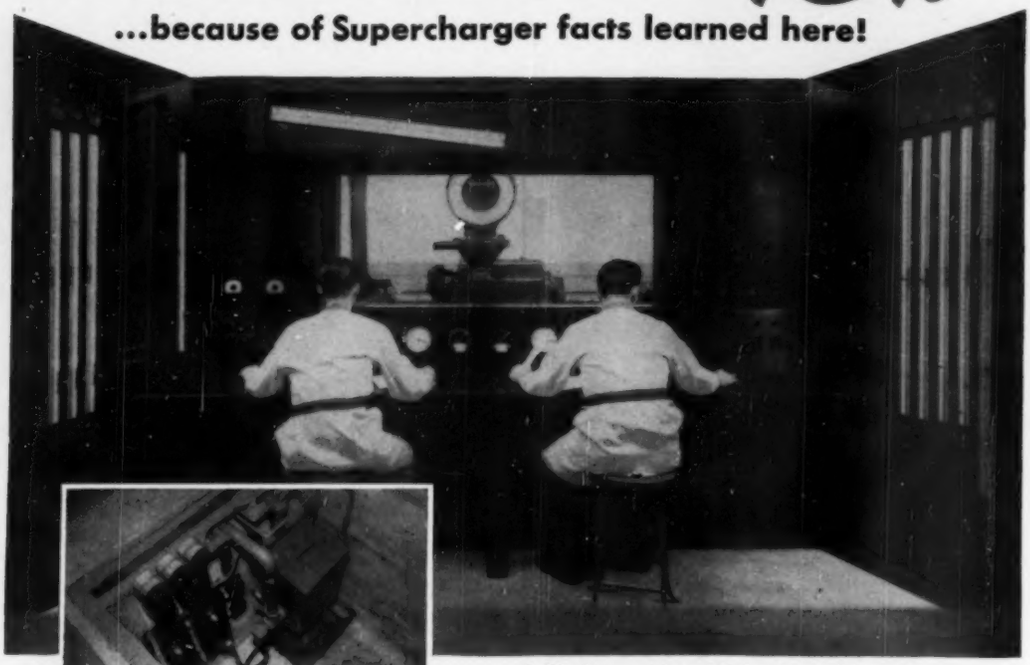
Rahway, New Jersey; and Toronto, Ontario, Canada

Protect your Power with Purolator!

PUROLATOR
MICRONIC OIL FILTER
"FIRST IN THE FIELD OF FILTERING"

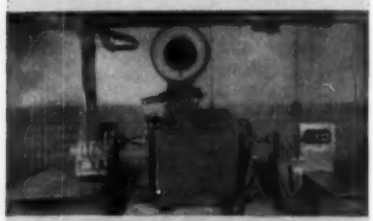
ENGINE POWER INCREASED 45%

...because of Supercharger facts learned here!



Looking into one of the test cells from the central observation room in which all conditions of the test are controlled.

The centrally-located and remotely-controlled oil system for Supercharger and equipment operation.



An observer's view of equipment and superchargers on test.

Here, in the world's finest supercharger test laboratories, Pesco engineers are daily searching for new ways to increase the flexibility and performance of gasoline and Diesel engines *without increasing their weight and size.*

In these supercharger laboratories in the new Pesco plant are all the facilities and equipment that 10 years of research and experience have shown to be necessary and desirable for the continued and expanding development of superchargers, and for investigating supercharged engine performance.

From these tests have come the facts that mean increased performance, better acceleration and more reserve power under all conditions of engine operation . . . facts that mean as much as 45 per cent MORE POWER from the same engine.

For the complete story of what B-W Superchargers can do for your Diesel or gasoline engine, write today.

engineering Pesco production

PRODUCTS DIVISION

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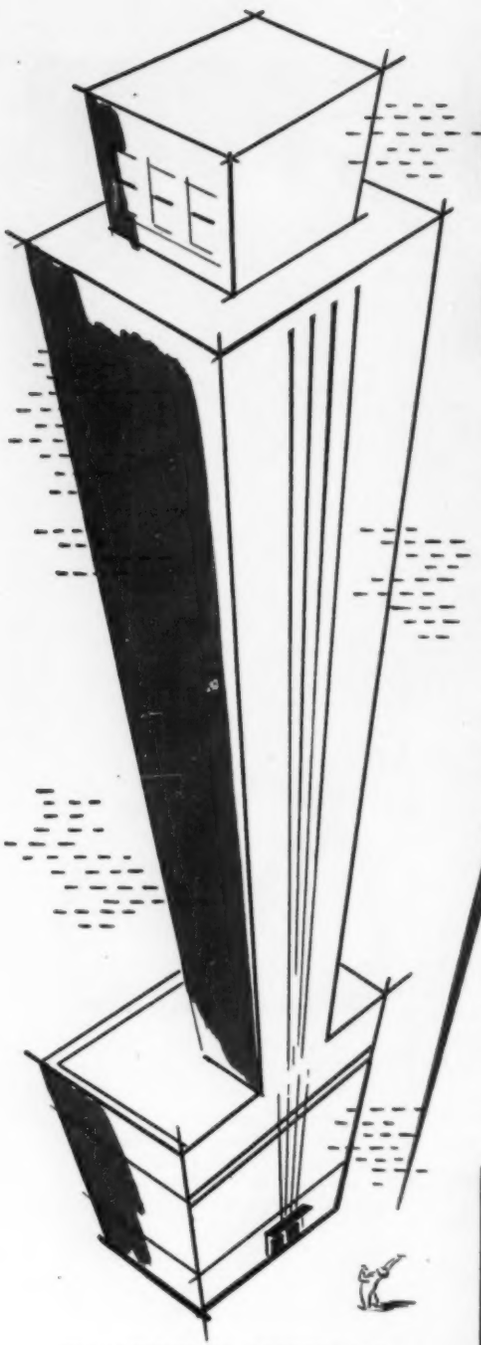

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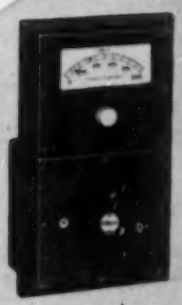

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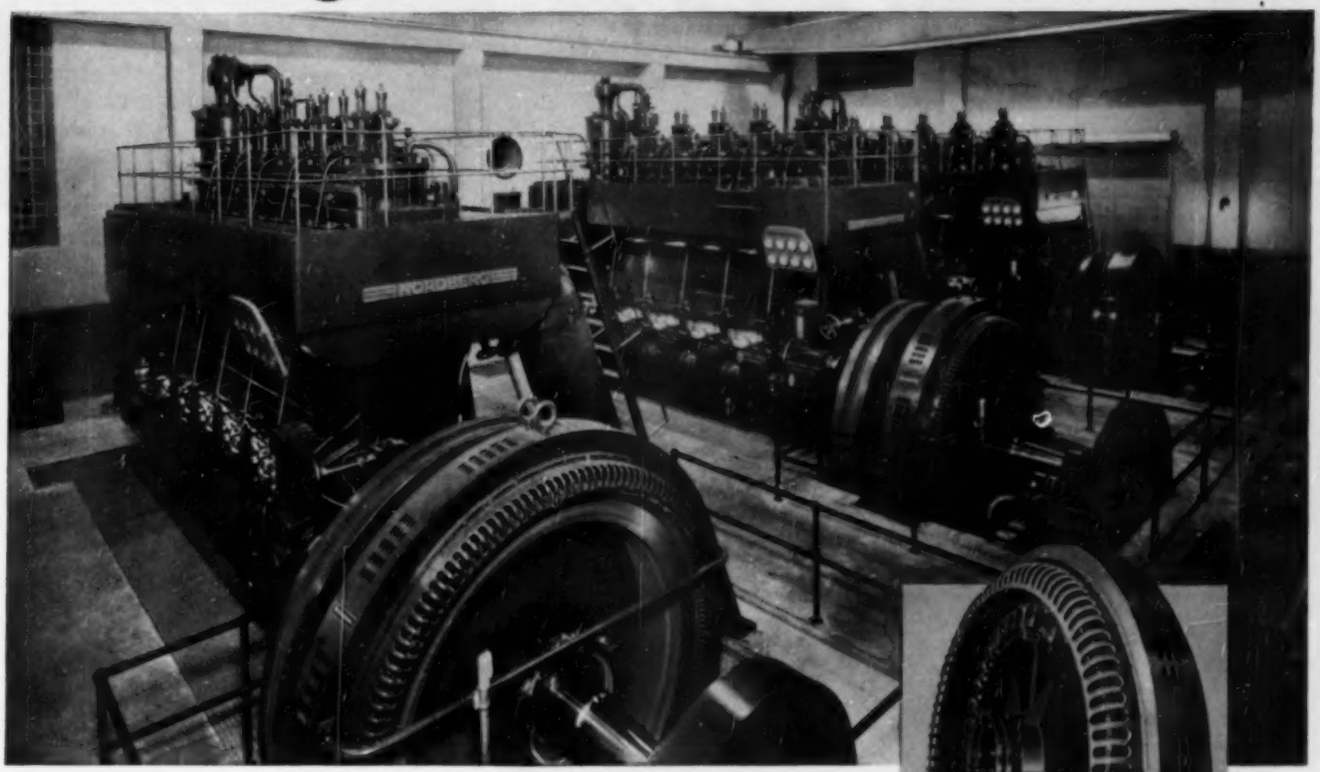

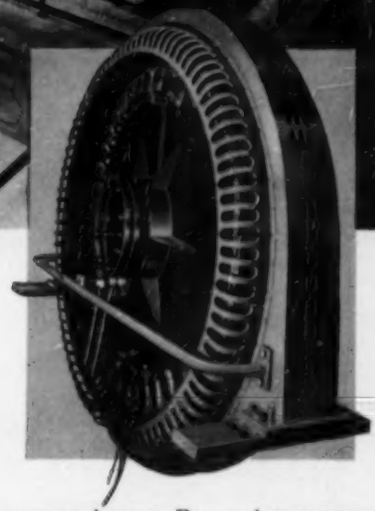

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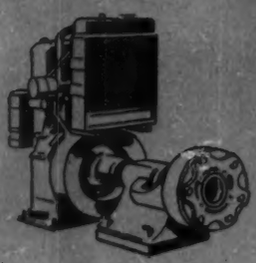
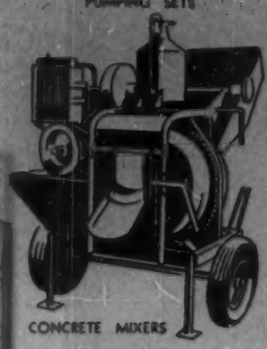
Westinghouse

DIESEL ENGINE DRIVEN AC GENERATORS

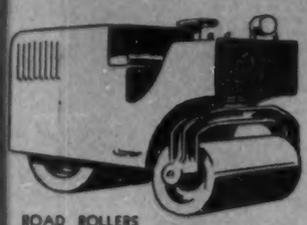
COMPRESSOR SETS



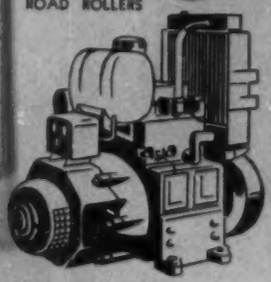
PUMPING SETS



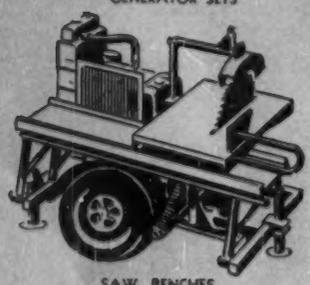
CONCRETE MIXERS



ROAD ROLLERS



GENERATOR SETS



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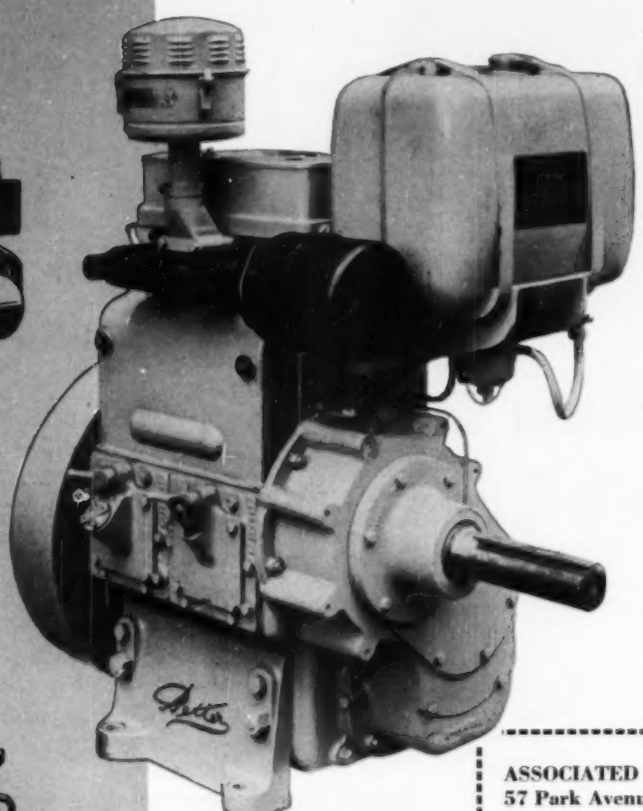

Illustrated is the Petter Model B. This engine comes in 2, 3 and 4 cylinders, giving 18, 27 and 36 hp. at 1500 R.P.M. ABOE, Inc., produces diesel engines from 5 to 2000 hp.

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FRONT COVER ILLUSTRATION

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"Although your claims for TEXON seemed exaggerated, we must admit that it does what you claimed. It has not been necessary to clean the tank, pump or injectors in seven months, and the saving in fuel is even greater than we expected." O. D. Drilling Co., Houston, Texas.

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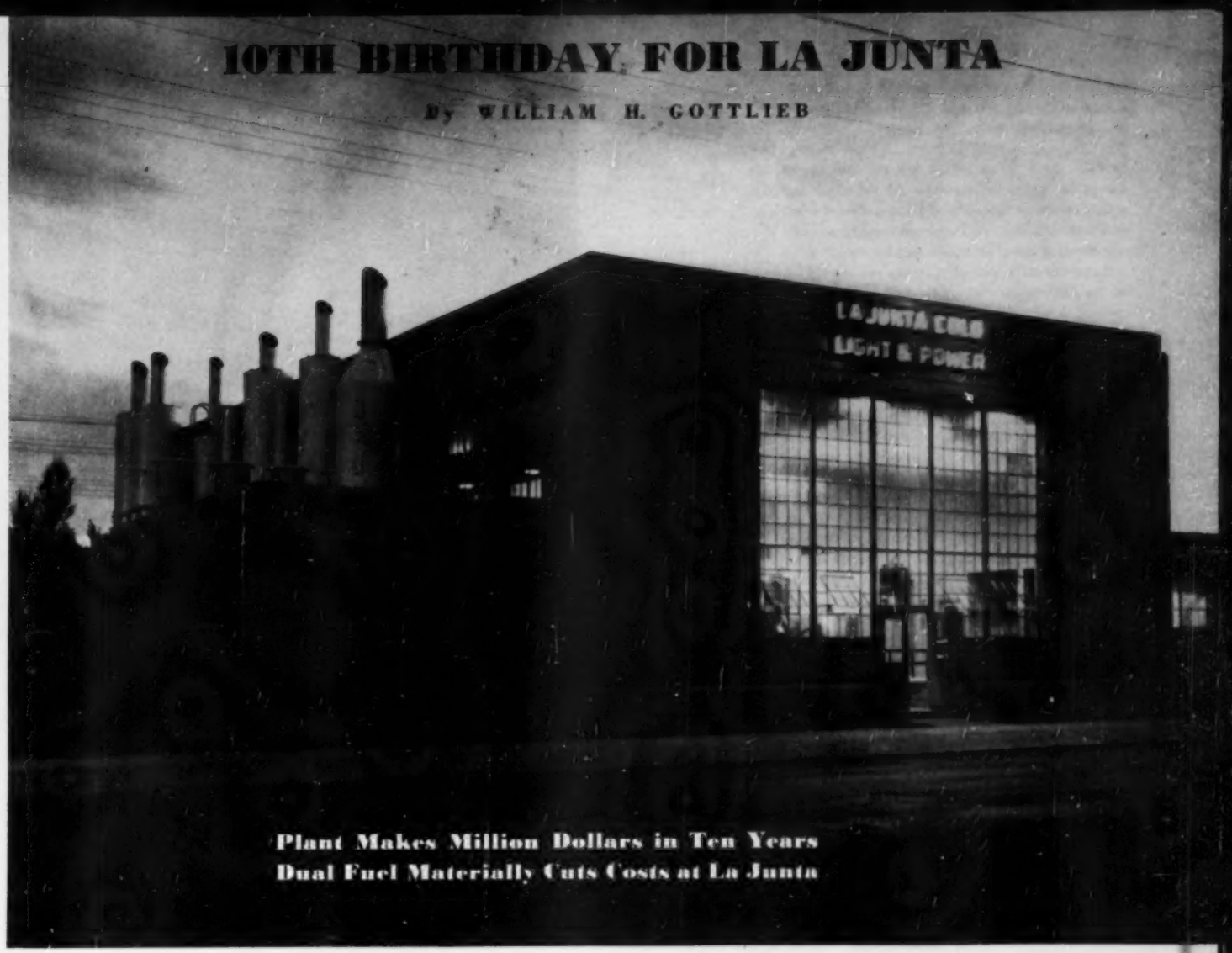
10TH BIRTHDAY FOR LA JUNTA

By WILLIAM H. GOTTLIEB



Plant Makes Million Dollars in Ten Years
Dual Fuel Materially Cuts Costs at La Junta

CELEBRATING its tenth anniversary, the La Junta, Colorado, municipal power plant, one of the major diesel plants in the Southwest, is making impressive news again. First, it is revealed officially that the 1,750-hp., 10-cylinder, 16x20-inch Fairbanks-Morse diesel has been converted to dual fuel operation, the first dual fuel engine of its size and type, and has completed a full year of successful service. Second, a new 2,000-hp. Model 33FD16 Fairbanks-Morse dual fuel engine has been installed, bringing plant capacity to 6,725-hp. Third, the other older diesels are being converted to dual fuel witha fuel saving estimated at more than $50,000.00 a year. Fourth, in ten years, the plant has generated more than 90,000,000 kw. hr. with benefits to the community totaling more than $1,000,000.00.

These accomplishments have significance far beyond the boundaries of La Junta. They mean that every F-M 16x20-inch diesel since the first, which was manufactured in 1929, can be converted to utilize gas fuels with important savings to those who have cheap gas available. This convertibility was deemed important by Fairbanks-Morse engineers in designing their new dual fuel engines and the converted units are the same as the new units in all essentials.

For example, this description of fuel handling at La Junta applies to both the 1,750-hp. and the 2,000-hp. engines, though the first was converted and the second built originally as a dual fuel. The 900 btu. natural gas reaches the plant at 50 psi. and passes through an individual meter and pressure regulator for each engine where pressure is reduced to 15 psi.

Before reaching the engine, the gas must pass first through a safety cut-off valve actuated by engine lubricating oil pressure. This valve admits gas only if the engine is turning over fast enough to bring lube pressure to operating level, if pilot oil pressure is adequate to insure combustion, and if engine speed is not excessive. The gas next passes through anr admission valve controlled by governor linkage, through a header along the cylinder heads, and finally through cam-actuated valves into each cylinder. The valve lift and timing at the cylinders are constant and only the pressure in the gas header (controlled by the governor) regulates the quantity of gas injected.

The charge of pilot oil which initiates combustion does not vary in quantity and is injected by a separate small-volume fuel pump for each cylinder, permitting a precisely regulated supply. The engine also is equipped with standard diesel fuel pumps which function when the engine is operating wholly on oil and cut in automatically to compensate for any gas deficiencies during dual fuel operation. Both pumps use the same injection nozzle.

Finally, to insure a favorable gas-air ratio, a governor-regulated valve controls the quantity of scavenging air admitted to the cylinders. The gas and air supplies are separate entities, independently controlled, so that there is always sufficient air for full combustion even with gases of low btu. content like sewage gas. Also, the physical isolation of the gas system at the top of the engine is an added safety factor.

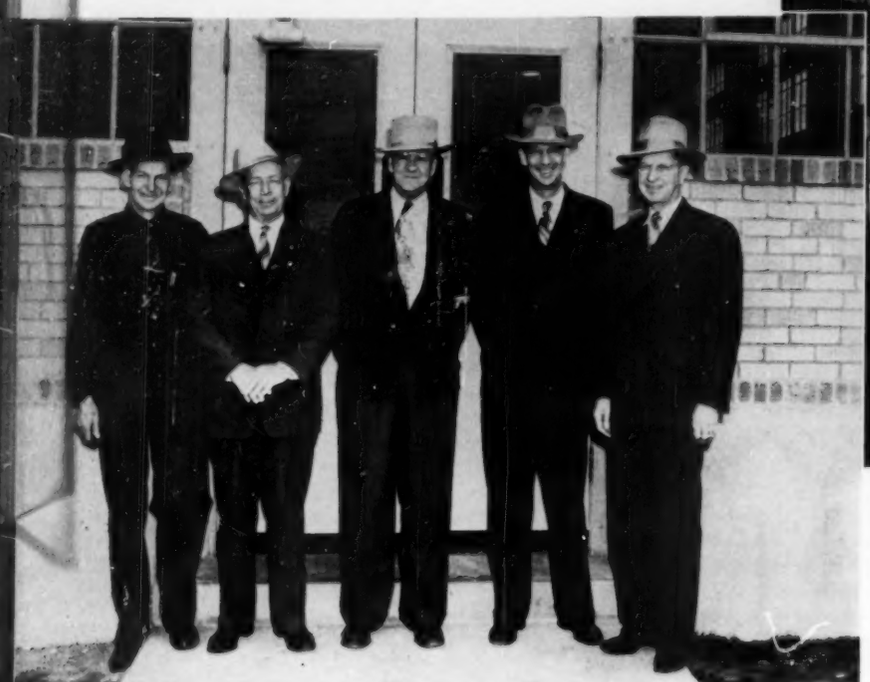
Like the fortunate prospectors who found rich ore in Colorado, La Junta has made pioneering pay profits. The city cooperated fully with the engine builder's design engineer in the development of the first 16x20-inch dual fuel unit. Yet, even that period of development and adjustment

resulted in a 50 per cent reduction in fuel costs, a solid saving of more than $15,000.00 for the first year on that one unit's operation.

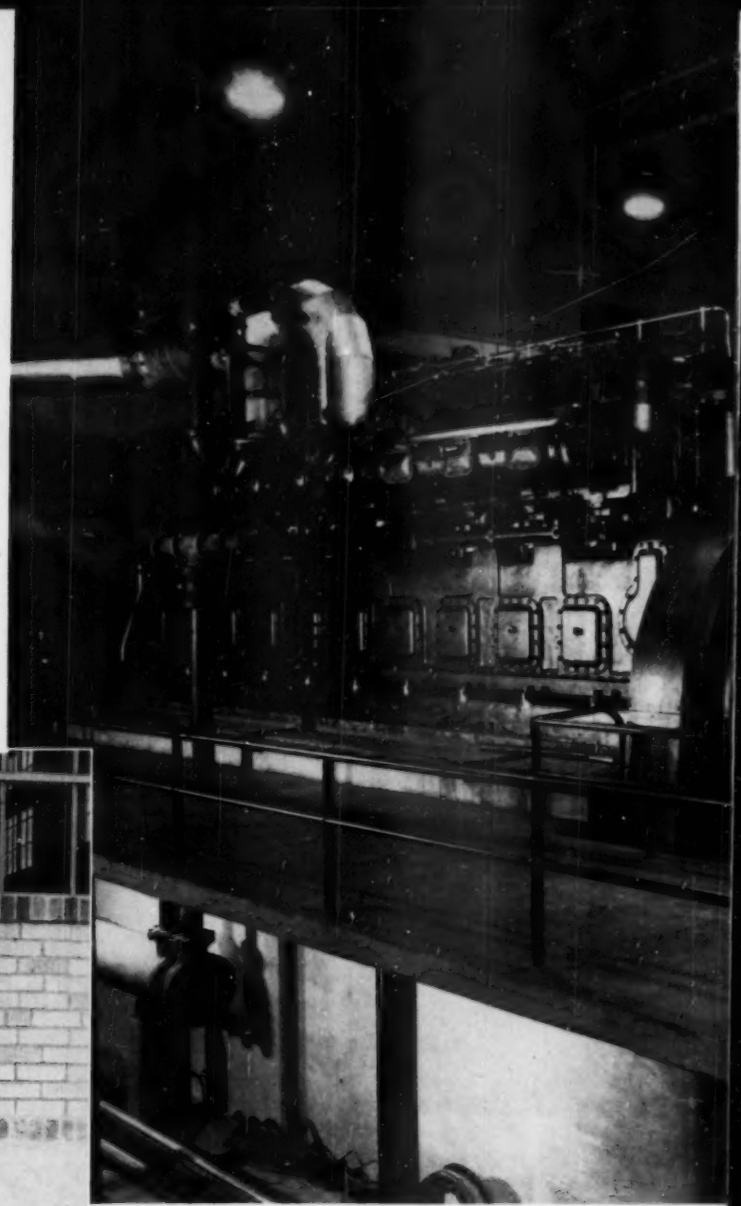
In 1949, the 1,750-hp. engine was the mainstay of the plant, operating virtually all the time and producing close to 6,000,000 kw. hr. Costs of gas and fuel oil for this unit were cut steadily throughout the year down to 4 mills per kw. hr. Further refinements are expected to bring the conversion to the full efficiency of a new dual fuel.

The new 2,000-hp. engine was first put to work on December 8, 1949. By March 13, 1950, the unit had run 1,120 hours and generated 1,096,300 kw. hr.

A combination of economical power production and sound business management has paid high dividends to the citizens of La Junta. The very day the diesels started turning in 1940, the city announced a 10 per cent cut in existing power company rates. Exactly one year later, an additional 5 per cent reduction was put into effect. On June 15, 1949, still another 10 per cent cut was ordered, giving La Junta one of the lowest rate schedules in Colorado. At power company rates, the consumers' purchases for the ten years would have cost $2,205,634.47; at municipal rates they actually cost $1,888,348.56, a saving of $326,678.67. (Actually this figure covers 9½ years, for the added savings of the last six months have not yet been calculated.) In addition, the plant has provided free services such as street lighting, Christmas lighting, athletic field floodlighting and park lighting which would have cost the city at least $20,000.00 a year or a total of $200,000.00 for the ten years. Also, the



Some of the key figures in the operation and administration of La Junta's municipal utility are (left to right): Chief Engineer B. A. Kibler, Power Board members A. M. Scott and J. Armstrong, Utilities Manager D. J. Goodhue and Mayor M. B. Chase.

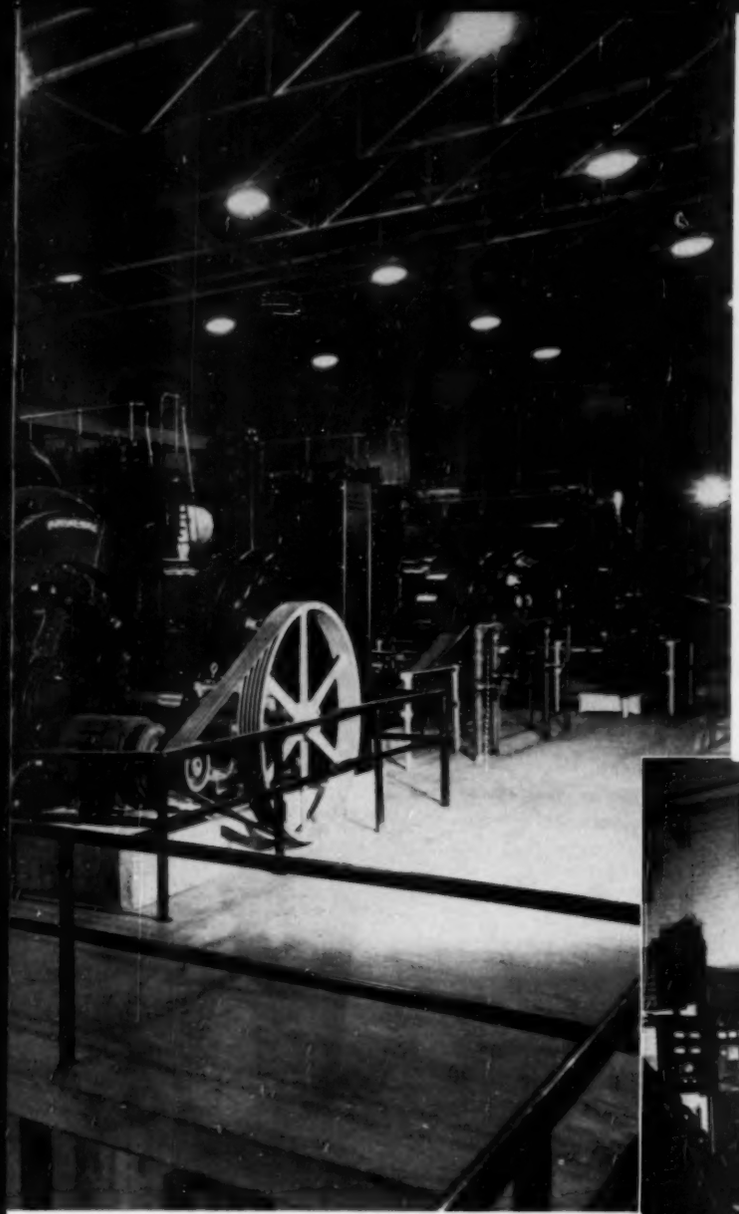


There are five Fairbanks-Morse engines totaling 6,725-hp. in the La Junta plant. In the foreground is the new 2,000-hp. dual fuel unit

Table I

Year Ending June 30	*Total Operating Revenue*	*Supervision and Labor*	*Fuel*	*Lube*
*1940	$ 33,532.29	$ 1,925.60	$ 6,006.89	$ 991.62
1941	148,406.83	6,890.92	20,309.37	1,030.50
1942	148,123.61	9,151.49	20,747.44	1,051.11
1943	178,012.64	9,879.94	31,022.38	1,768.47
1944	224,184.97	12,478.20	52,045.67	2,643.83
1945	238,821.06	13,030.18	54,409.72	2,650.00
1946	231,822.22	15,774.28	45,300.36	2,683.39
1947	249,493.10	19,157.77	62,237.80	4,238.13
1948	268,491.08	20,093.88	95,928.83	4,831.26
1949	282,947.65	22,084.55	94,260.96	4,599.14
Totals	$2,003,835.45	$ 130,466.81	$ 482,269.42	$ 26,487.45

* 3 Months.

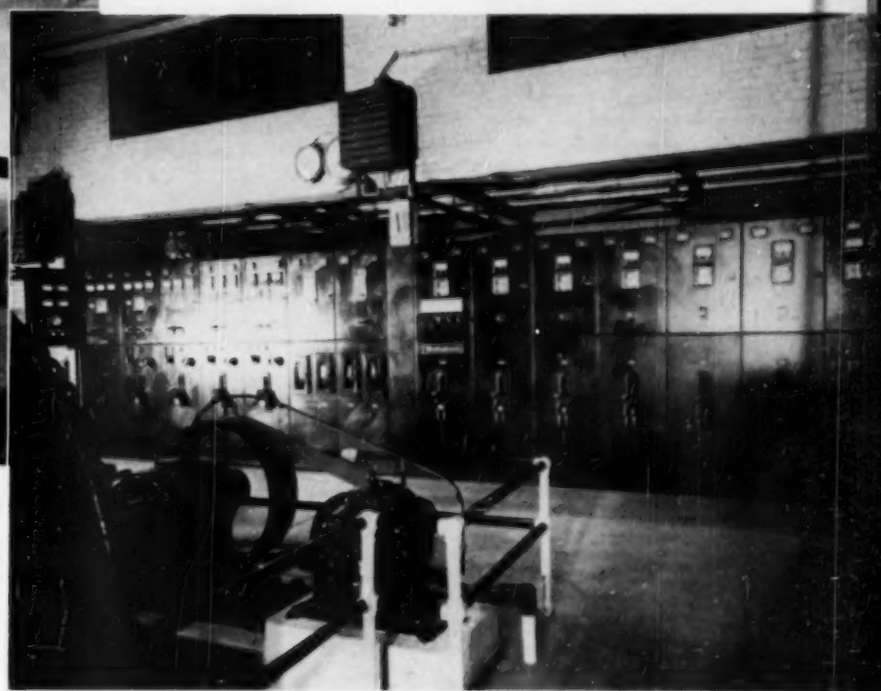


and at the far right is the 1,750-hp. engine which has been converted to dual fuel operation.

municipal utility pays the city substantially more in taxes than the private utility did—an average of $9,893.58 a year as compared with $2,500.00, a net gain to the city of $73,935.80 for ten years.

Yet, in spite of successive rate reductions, in spite of free services, in spite of higher tax payments, and in spite of rising costs in an inflationary period, the diesels earned for La Junta an impressive profit. By the close of the fiscal year ending June 30, 1949, operating revenues for the life of the plant totaled $2,003,835.45, while total expenditures, including plant operating, distribution, administration, taxes, interest and depreciation, came to $1,339,262.02, leaving a clear net profit of $664,573.43. Again the figure for the full ten years is not yet available and would show an even larger profit. Table I gives detailed annual figures for the period cited and shows how income kept climbing despite the rate cuts. The actual reduction in fuel costs from 1948 to 1949 while kw. hr. output rose reflects the city's aggressive action to combat high oil prices by turning to natural gas.

Here's the simple total of the financial benefits described above:



The plant is served by a modern well-equipped Westinghouse switchboard.

Consumer rate savings (9½ years)	$ 326,678.67
Free services (10 years)	200,000.00
Higher utility tax payments (10 years)	73,935.80
Net profits (9¼ years)	664,573.43
Total	$1,265,187.90

Fuel is an important cost factor, but it is by no means the sole determinant of a power plant's success. The late W. H. Goodhue, utilities superintendent, who built the plant, and Henry Klein, who was Mayor when the plant was started, believed in heavy duty prime movers, good protective accessory equipment, alert and methodical operating, and careful cost accounting. D. J. Goodhue, the

ant Operating Expenses

ater	Supplies	Maintenance	Total Plant Operating	Total Expend. inc. Plant Dist., Admin., Taxes, Int., Deprec.	Net Profits
30.00	$ 386.77	$ 372.75	$ 9,713.63	$ 26,452.01	$ 7,080.28
11.00	1,127.51	1,675.89	31,148.19	88,330.51	60,076.32
20.00	1,461.41	1,932.11	34,463.56	91,711.30	56,412.31
30.00	1,634.80	2,038.31	46,473.90	110,857.32	67,155.32
20.00	2,326.99	1,991.53	71,606.22	137,130.17	87,054.80
20.00	7,626.59	2,116.12	79,952.61	142,489.41	96,331.65
40.00	5,722.26	2,309.00	71,929.29	140,428.73	91,393.49
01.00	4,748.19	6,424.71	97,107.60	172,787.11	76,705.99
20.00	4,495.92	8,201.90	133,671.79	208,097.16	47,512.78
20.00	5,007.74	6,858.26	132,930.65	220,978.30	61,969.35
15.00	$ 34,538.18	$ 33,920.58	$ 708,997.44	$1,339,262.02	$ 664,573.43

present utilities superintendent, Chief Engineer B. A. Kibler, and members of the Power Board, hold the same views and are implementing them. Thus, the 2,000-hp. engine is of the same type as its four predecessors and develops its rated horsepower at a moderate 300 rpm.

Lubricating oil is cleaned continuously by circulation through a filter with cotton-waste elements. The full pressure lubrication system which supplies the bearings and cools the pistons includes an engine-driven pump and a shell-and-tube cooler. A motor-driven auxiliary pump is used to circulate lube before starting and after shutting down the engine. Fuel oil is passed through a cotton-waste filter before the day tanks and also through a special filter on the engine to protect pilot oil pumps.

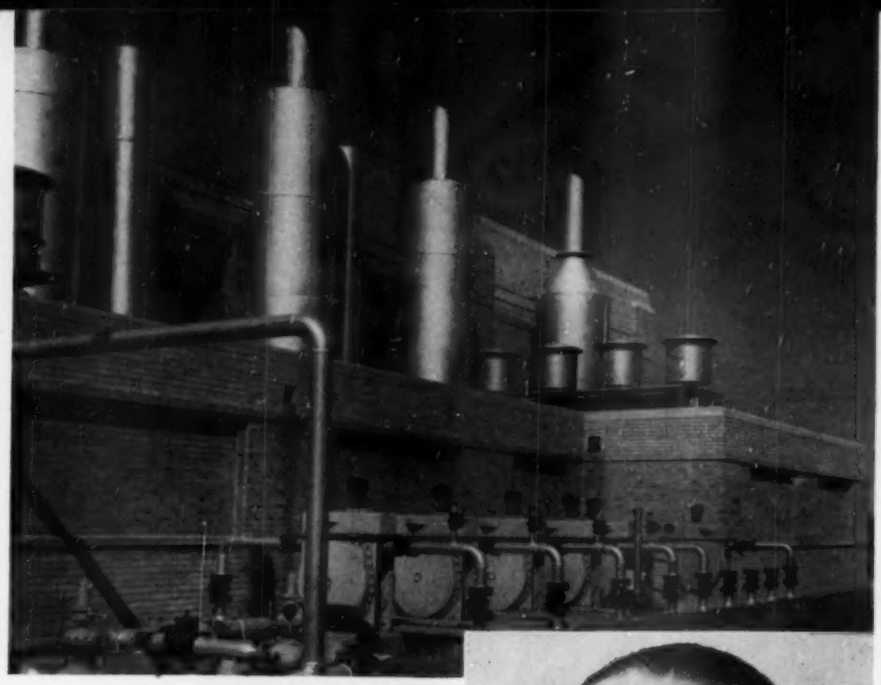
Scavenging air for the big engine is drawn through a battery of four oil-bath air filters and supplied to the engine by a blower driven by a 125-hp. motor. This motor is powered directly from the engine-driven alternator. A 48-volt wet cell battery forces the field of the alternator, insuring a quick supply of power to drive the blower when the engine is started. Engine exhaust gases vent through vertical silencers at the side of the plant.

La Junta's 58 grain water is softened in two hot wells and circulated by five motor-driven centrifugal pumps through the engine jackets and the coils of a three-section forced-draft cooling tower. Four additional pumps handle the raw water for the tower.

Separate records are kept of operation, production, fuel and lube consumption, and maintenance work and expenditures for each engine in the plant and serve as a guide to intelligent and economical operation. That kind of operation is paying off handsomely in benefits to the plant's collective owners. The records indicate that conversion to dual fuel will raise profits and attendant benefits to new heights.

The utilities system is managed by Mr. Goodhue under the supervision of a Power Board consisting of Mayor M. B. Chase, three members elected for six-year terms, and a representative of the City Council.

Lubricating oil for the new engine is filtered continuously in this Midwest filter.



When conversions are completed all La Junta's engines will use natural gas and individual Emco gas meters and regulators have been provided for each engine. Also shown are the Air-Maze air filters and Maxim exhaust silencers.

Henry Klein, who was Mayor of La Junta when the plant was started ten years ago, and to whom much credit must be given for his foresight in this profit-making municipal diesel plant.

List of Equipment

Engine – 2,000-hp., 16x20-in., 300 rpm., Model 33FD16 dual fuel engine. Fairbanks, Morse & Co.

Alternator–Fairbanks, Morse & Co.

Governor–Woodward Governor Co.

Scavenging Air Blower–Roots-Connersville.

Lube Filter–Midwest Filter & Mfg. Co.

Lube Cooler–Ross Heater & Mfg. Co.

Auxiliary Lube Pump–Geo. D. Roper Corp.

Air Filters–Air-Maze Corp.

Exhaust Silencer–Maxim Silencer Co.

Cooling Tower: The Marley Co.

Cooling Water Pumps–Fairbanks, Morse & Co.

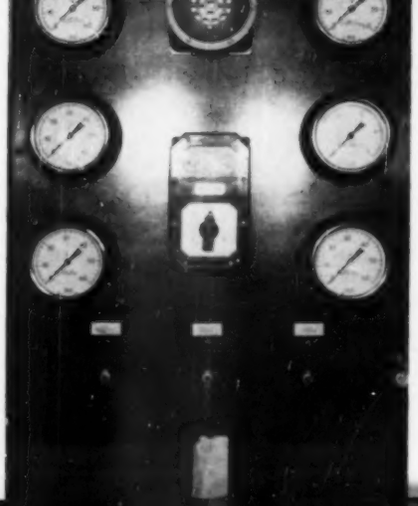
Fuel Filter–Midwest Filter & Mfg. Co.

Gas Meter and Regulator–Emco.

Exhaust Pyrometer–Brown Instrument Co.

Switchboard–Westinghouse Electric & Mfg. Co.

The 2,000-hp. unit is served by a compact gauge and alarm panel which also holds a Brown exhaust pyrometer.



DIESEL STRETCHES THE ROAD DOLLAR

Frank A. Nikirk Reviews Heavy Construction Trends as He Goes to University of California Post to Develop New Courses Aimed to Train Young Engineers for Contractor's Jobs.

By F. HAL HIGGINS

DIESEL engines and heavy duty hydraulic rubber tires have been the twin factors in building the great highway system of the U. S. just before World War II halted the development. And this speedy development and change-over of power cut costs sharply to multiple the power of the taxpayer's dollar in the face of rising labor costs. Not only road building, but all dirt moving for dams, airports, etc., shared in the gains from the use of diesel power that permitted much work to be done for the public that could not have been done at former costs." So declared Frank A. Nikirk, famous civil engineer with nearly a half century of experiences in public and private engineering work, as he moved to his new position at the University of California. Here Nikirk will develop new courses to meet the demands of the times and help fit young engineering graduates for positions with contractors.

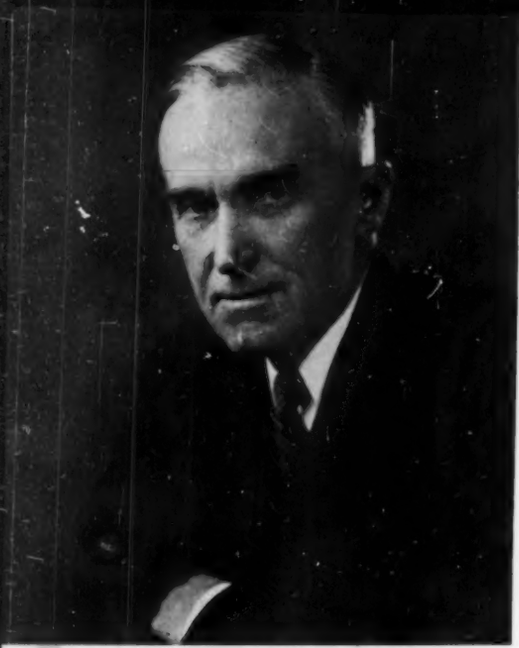
Mr. Nikirk is a graduate of Stanford University. Following graduation he did railroad survey work, city engineering for San Jose, operated a private engineering service, then to the sales staff of Caterpillar Tractor Company till the recent war, when he was loaned to the U. S. Engineering Corps for war service. Following his war service, Nikirk joined the Thew-Lorain Co. as that manufacturer of power shovels and draglines changed over to diesels. The International Harvester Co. heavy dealer at Albany, N. Y., Milton-Hale, brought the veteran engineer into its organization when Henry Hale became president of this powerful dealer organization in the important construction state of New York. Mr. Hale, a graduate of the University of California, is behind the move to help his alma mater solve its engineering courses by loaning Nikirk for the important job of aiding the staff in working out new courses to meet the pressing demands of the times.

The writer has known the new "professor" for some twenty years, though the veteran engineer says he is "neither fish nor fowl at UC" and has not been asked to sign any loyalty oaths nor does he draw a university salary check. But having seen him in action in sound engineering work on the sales staff advising one of the big manufacturing concerns on selling U. S. Forest Service, big and little highway departments, contractors and various governmental bodies, the writer is certain that no sounder choice could have been made in picking the man to set up the new courses. For the past three years, the University of California has been seriously considering setting up such a program as is now being started at Berkeley. Not till President Henry Hale of Milton-Hale came to the aid of his alma mater and offered to loan Nikirk from his staff at Albany, did the right man appear available to such a post. The tremendous growth of the West, with its attendant call for more and more heavy construction of roads, streets, dams, pipe lines, airports, etc., has awakened several western colleges to the need of expanding the curriculum in civil engineering from the pioneer railroad building days when they were started. "Courses in construction" must be added, they have decided. Students taking such courses would be better equipped to find jobs with contractors, have better chances of advancement, and be of more immediate value to their employers. As it is, most graduate engineers were lost for a year or two as they attemped to fit themselves into contracting firms.

The writer dropped over to the Engineering building on the Berkeley campus recently to renew his acquaintance with the veteran "SI" to see what he had to say about his new post that might interest DIESEL PROGRESS readers. He knew that Nikirk had seen the big change-over in power and could assess its importance and possibly chart its future in this field better than anyone he knew. On the other hand, he also knew that these veteran engineers who have lived their calling and seen the big jobs as done by the best contractors in the world know enough about engineering history as it is made on the construction front not to go out on any prediction limBs. What one contractor uses to cut time and costs does not set up a hard and fast pattern to be used on other jobs. The variables in terrain, weather, equipment, personnel, experience of contractor, etc., keep the smart contractors who survive using all their experience and know-how plus a persistent seeking for new equipment to solve their problems better and cheaper. And what is one contractor's poison is sometimes another contractor's food.

But Nikirk stresses the place of management in the future. Machines have been developed rapidly and effectively to a point nearing perfection. Nikirk compares the "make work" theories and practices of the "depression thirties" with the English rioters of two centuries ago. They broke up mill machinery for fear of losing their jobs. This type of

Frank A. Nikirk was sent down to Texas by one of the big diesel tractor builders a few years ago and here he introduced heavy road building and dirt moving equipment to clear the brush off valuable cattle pastures and restore great areas to ranching again. Here is one of the pieces of equipment developed by Bill Holt, San Antonio dealer, in cooperation with ranchers and U. S. Conservation engineers to meet the demand for fast and cheap brush clearance.



Frank A. Nikirk, veteran Civil Engineer, as he takes a new post at the University of California to work out courses aimed to fit young engineering grads into contractors' organizations.

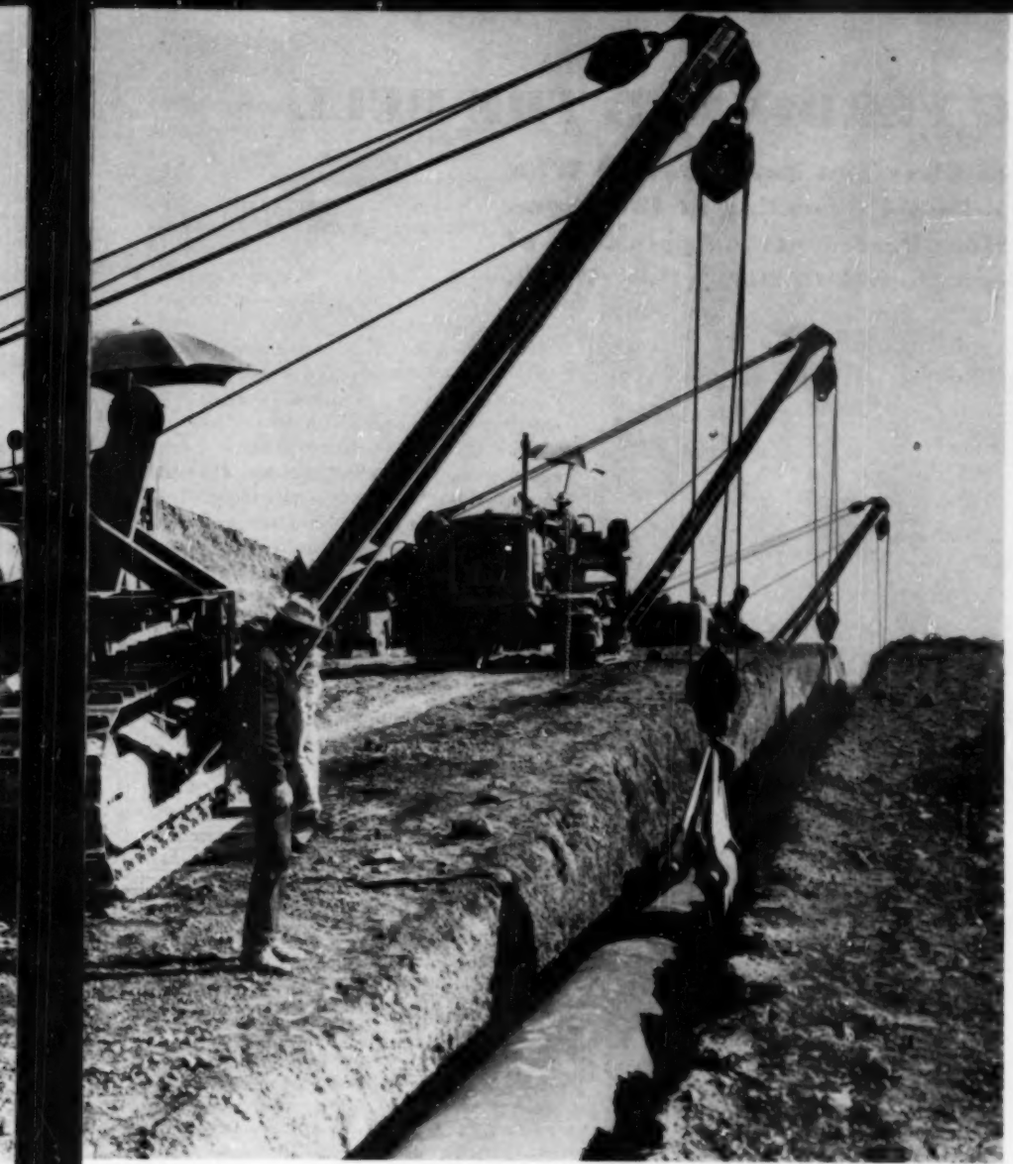
political messing with road and street construction wasted untold millions and kept a lot of roads from being built when they were badly needed in the U. S., of course. In the early post-war years, this kind of thinking by governments big and little has cut the output per man to possibly 60 to 75 per cent of pre-war production, he estimates. "Probably the most outstanding development of the '30's was the adoption of diesel power to replace gasoline engines, plus the development of low-pressure heavy-duty pneumatic tires for off-the-road haulage," emphasized Nikirk. "These two factors alone were largely responsible for keeping down the unit cost of construction on grading contracts in spite of rising costs of labor in the latter part of the decade." Thus did the diesel play a big part in getting the highways built in spite of political blindness in the use of the taxpayer's dollar. Here the soft spoken engineer leaned back from his portfolio of work to emphasize the heavy accent now placed on management. "In tracing the mechanization of the construction industry, there are three factors that should be kept in mind: (1) The rapid increase in skilled and semi-skilled workmen with a decrease in the number of unskilled laborers that was coincident with the adoption of mechanized equipment. This led to the development and perfection of new skills, techniques and crafts. (2) The rise in the percentage of off-the-job employment compared with those on the job. It has been estimated that the construction industry affords employment for two men off the job for one on the job. This includes those engaged in manufacturing, transportation, selling and servicing equipment, materials and supplies. Some of these men through a wide range of observation and experience become possessed of certain specialized information and skills which should be made available to the men on the job whether they be operators, mechanics, supervisors or superintendents. (3) The adoption of mechanized equipment led to scientific management and better business practices in the construction industry. When man's productive effort was increased many fold by the use of mechanical power, it became necessary to so lay out the job and so prosecute it that the machine could be worked at a reasonable degree of efficiency. The picturesque old "Dirt Mover" of the past decades who ruled with a pick handle was no longer effective. He was forced to give way to the man with more executive ability. This man planned his work methodically and kept careful analytical records of its progress. The adoption of such scientific methods and processes in construction required engineering training for their understanding and execution. It is in this field that the greatest hope for solving our present economic problems lies."

That Nikirk has been putting a lot of post-war thought and study of the trends in construction engineering in his contacts with colleges, contractors and government is shown in his breakdown of the job management problem. "There are four phases of Engineering Management that govern the economy of construction," he points out. "They all require an intimate knowledge of equipment and its uses: (1) The selection, training and direction of men. (2) The selection, use and repair of equipment. (3) The planning and layout of work to permit the most efficient use of men and equipment. (4) The operation of a cost control system, including cost analysis, estimating, and cost of accounting. It has already been stated that the construction industry today requires more skilled and semi-skilled employees than ever before. The old source of supply obtained through the haphazard trial-and-error method of gaining experience was interrupted during the war, and many who had passed the test found other more agreeable or more lucrative employment. Training through chance will not meet present day needs. Some of our larger and more progressive contractors are providing systematic training for both technicians and administrative employees. By far the greater number of organizations are not large enough to provide this specialized training. Both employers and employees of this group welcome an opportunity for the improvement of skills and techniques even if available only at periodic intervals." Here the seasoned know-how of nearly a half century of engineering experiences on every type of operations touching dirt moving was sagely packaged by the tall graying authority.

"The selection of the type of equipment goes hand in hand with adoption of methods. Then follows choice of make, size, model and number of units required on the job. These decisions require a thorough knowledge of the job to be done and the physical conditions surrounding the work — weather, topography, soils and working area. When a project is of sufficient magnitude, selections are made for a particular job. More often, especially

Diesel-powered tractors with side booms make gas and oil pipe laying a fast and easy job. In front is an International TD24, followed by a Cat D8 and

International diesel wheeled tractor pulling Marvin landplane at a demonstration of road machinery used in a Farm-in-a-day demonstration in Colorado. In background are Buda, Hercules, Waukesha, Caterpillar, Cummins and GM diesel-powered equipment — trucks, draglines, shovels, compressors, graders, scrapers, etc.



another TD24. It is such selection and management of fleets of big diesel-powered equipment in the hands of skilled operators that Frank Nikirk has been called to the University of California to set up special courses for your engineers who want to join contractors' organization when graduating.

Henry M. Hale, President of Milton-Hale Machinery Company, Inc., Albany, N. Y.

on highway work, equipment is chosen for a general type of work and for conditions pertaining to that area. Choice demands a knowledge of what the machine in question can do: type, quantity and quality of work that may be expected. It is equally important to know what factors or conditions restrict or limit its functioning in order to determine its performance under specific conditions. This requires not only a knowledge of the machine to be used but also the ability to analyze the job to be done. Job analysis is an important part of the training of personnel for administrative positions and is required for planning and laying out work on engineering projects. One has but to observe a well organized construction force clicking with clocklike precision and completing successive stages of the work in orderly sequence to realize the necessity of proper planning, scheduling and timing. Such progress comes only when the equipment and working force are fitted to the job."

Mr. Nikirk has been interviewing engineering students individually as well as talking to them in classes at both Berkeley and the U.C.L.A. campus at Los Angeles in recent weeks as he sizes up his problem and works with the U. C. Engineering staff. He realizes he has a diplomatic job in getting such a new course launched. With auto ownership going up by jumps to further overcrowd the obsolete highways, streets and bridges of the United States, road building is only in its infancy. Yet only last month *Business Week* published an estimate of an immediate need of 41 billion dollars worth of roads and streets to bring the United States up to current needs. If better management of dirt moving equipment and the skilled workers who operate the big diesel-powered fleets of tractors, shovels, compressors, draglines, trucks, self-propelled carry scrapers, loaders, pavers, mixers, rollers, graders, gravel plants, etc., can increase production per dollar of tax money 25 per cent, Nikirk has one of the most important posts of the day and it is a labor of love for the veteran engineer to undertake this task.

DIESELIZING FERDINAND THE BULL

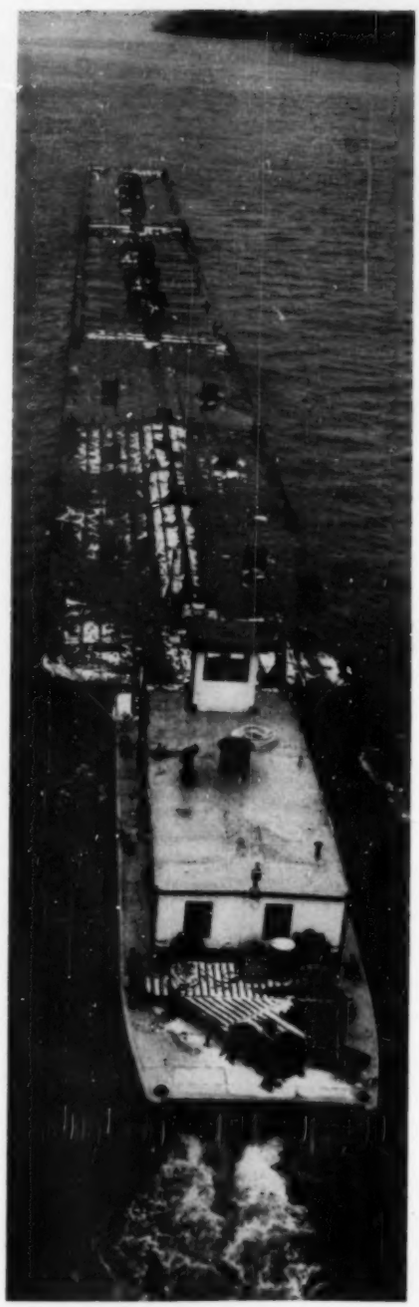
Sixty Foot River Tow Boat Powered With a 400 hp. Diesel Operating at 1200 rpm. Breaks More Precedents in Application of High Speed Diesels to Heavy Duty Work.

By WILL H. FULLERTON

WALT DISNEY'S Ferdinand was "the Bull with the delicate ego," and was the inspiration for the name of this new towboat, but the *M.V. Ferdinand* of the Bull Towing Company is "a boat with a definite push." Designed and built by the St. Louis Shipbuilding & Steel Co., the *M.V. Ferdinand* is one of the best pushers per horsepower ever tested by the builder. This includes boats built by them and all other boats tested. The *Ferdinand* hull is 68 feet by 19 feet by 8 feet, with a normal draft of 5 feet 6 inches. The bow is a modified scow bow, and the stern has very little tunnel. The quarters for six men, bathroom, galley and mess, and deck-locker are all on one deck, and the pilothouse is of the raising and lowering type, as the boat is designed so it can operate in the Chicago area. The deckhouse and pilothouse are of steel construction, lined with masonite, and insulated with 2 inches of Fibreglas. All sash, except the forward pilothouse sash, are Truscon steel sash. The *Ferdinand* is equipped with a Kort nozzle and also a Contraguide steering rudder, both of which contribute to the outstanding performance of the boat. In addition to the Contraguide steering rudder, the boat also has two backing rudders; all rudders are controlled by a St. Louis Ship electro-hydraulic steering system with electric follow-up controls.

The boat is powered by a Caterpillar, 12-cylinder, 5¾-inch bore by 8-inch stroke, 4-cycle V-type marine diesel engine developing 400 hp. at 1,200 rpm., fitted with a Falk 4.03 to 1 reverse and reduction gear. The performance of the *Ferdinand* will be watched with great interest, as it is the first river towboat to use one of the new Caterpillar D397 engines. The electric power on the boat consists of a U. S. Motors 10-kw. 115-v., d.c. diesel generating set, a Witte 2½-kw. set, and an Exide 56-cell, 112-v. marine battery floating on the line. Two 12-inch arc searchlights are mounted on the pilothouse and raise and lower with it. The boat is provided with the usual water pressure systems, heating system, plumbing fixtures, etc., and is in every way an efficient, modern boat with sufficient fuel and water supplies to operate for ten days' continuous operation.

The compact design of the D397 Caterpillar diesel engine makes it especially adaptable to installations in the small space generally available in towboat engine rooms. It is 148-1/16 inches long, 32 inches from the crankshaft centerline to the bottom of the marine gear housing, and 53-7/16 inches from the crankshaft centerline to the top of the engine,



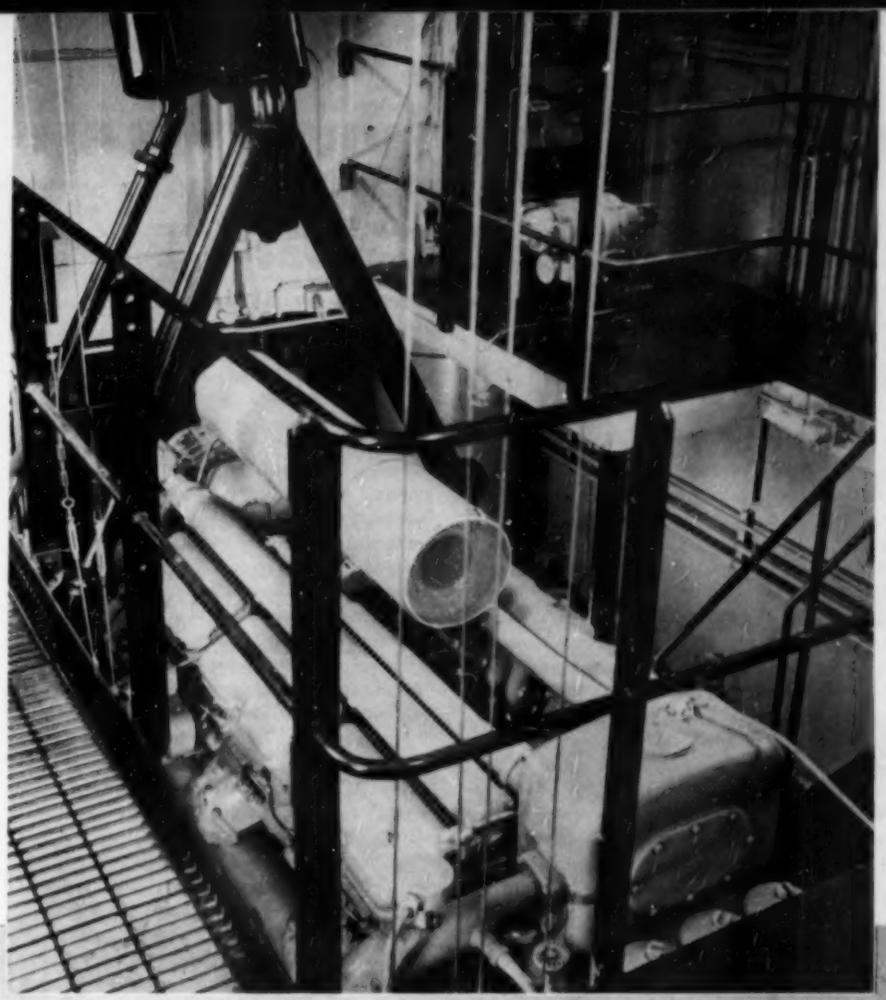
making a total height of 85-7/16 inches. The total outside width of the engine is 48⅝ inches. The cylinder block is a heavily-ribbed, one-piece alloy iron casting of the integral cylinder type, with removable, wet-type, Hi-Electro hardened liners. The valve mechanism, including valve rotators, is enclosed by a sheet steel cover bolted in place between the cylinder banks. The welded steel base includes an extension for the marine reverse gear and a mounting flange which permits the engine to be bolted solidly to the longitudinal stringers in the hull. Of special interest to Mr. Edwin T. Bull, president of Bull Towing Co., is the large access openings provided in the sides of the block for inspection and removal of connecting rods, bearings, and piston assemblies. When Mr. Bull visited the Caterpillar engine factory to look over the engine, he said he specifically checked this feature, because he had learned through bitter experience the exasperation and misery of scraped hands suffered in working through small openings.

The engine is started by air. A vane-type air motor is connected to the flywheel ring gear through a Bendix-type drive. Air is supplied from a 250 psi. receiver, which is charged by a 3-hp. Gardner-Denver electric motor-driven compressor. The *Ferdinand* has a "skin"-type engine cooling system. Engine jacket water is pumped through water lines which are a part of the sides of the hull. This jacket water is also circulated through the water-cooled exhaust manifold. The engine and marine gear oil is cooled by circulating water through an oil cooler. This water is cooled by a separate skin cooling arrangement. An auxiliary water pump, driven by the D397, circulates the water used in the oil cooling system.

The engine base serves as an oil reservoir. A horizontal metal partition extends the length of the base, dividing it into two compartments. The lower compartment contains the oil supply, and the partition or shield protects the oil at all times from the effects of engine heat and gases. This feature, plus filtering and cooling of the oil before it returns to the working parts of the engine, gives in effect a "dry sump" system with all its many advantages. The oil pumps mount on the shield in the sump and are driven from the front crankshaft gear through an idler. Oil is picked up by the main pump through the lowest suction bell and circulated through the three-unit metallic strainers mounted on the front of the engine. The external oil filter tank contains twenty-four filter elements and is equipped with a by-pass valve that limits

the pressure on the filters to prevent the possibility of any foreign matter being forced through the elements. Two scavenge pumps are mounted directly behind the standard pumps, to transfer the oil that collects in wells at the front and rear of the shield to the lower compartment.

All major parts of the fuel system, with the exception of a priming pump, are located in the "V" between the cylinders. The filter uses seventeen standard Caterpillar filter elements and has internal baffling to protect the elements from the turbulence created by the fuel as it enters the housing. This D397 marine installation uses an air intake silencer connected directly to the intake of the blower. A two-cable control system is used for actuating reverse gears and the governor control lever. A Vickers hydraulic pump for hydraulic steering controls and the pilothouse hydraulic lift is driven from the front power take-off. Already in service on the inland waterways, the *Ferdinand* passed through Peoria, Illinois, on February 15, with a 4,500-ton tow consisting of three oil barges totaling 585 feet in length. Her skipper, Captain Franklin H. Coats, displayed a broad smile as he said: "She's really pushing! Doing a fine job. The river's at flood stage and the current much stronger than normal. Still we're getting 4½ mph. upstream—that's mighty good! We went through pool water at 7 mph. Our engine must be dependable, because we tow on a contract basis. This 'Cat' has really got it!"



DIESELS IN A HYDRO SYSTEM

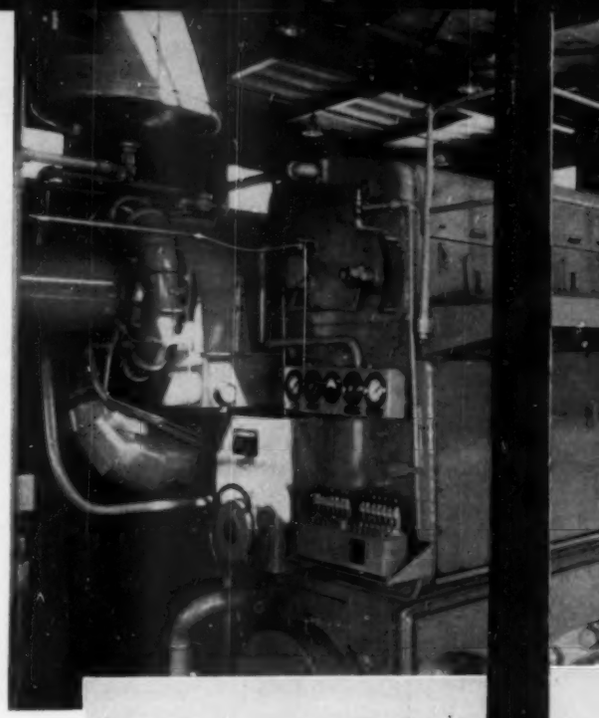
Bangor Hydro-Electric Company installs Four Nordberg Diesels in Three Power Stations and Is Adding Two More to Insure Service in Adverse Conditions.

By DWIGHT P. ROBISON

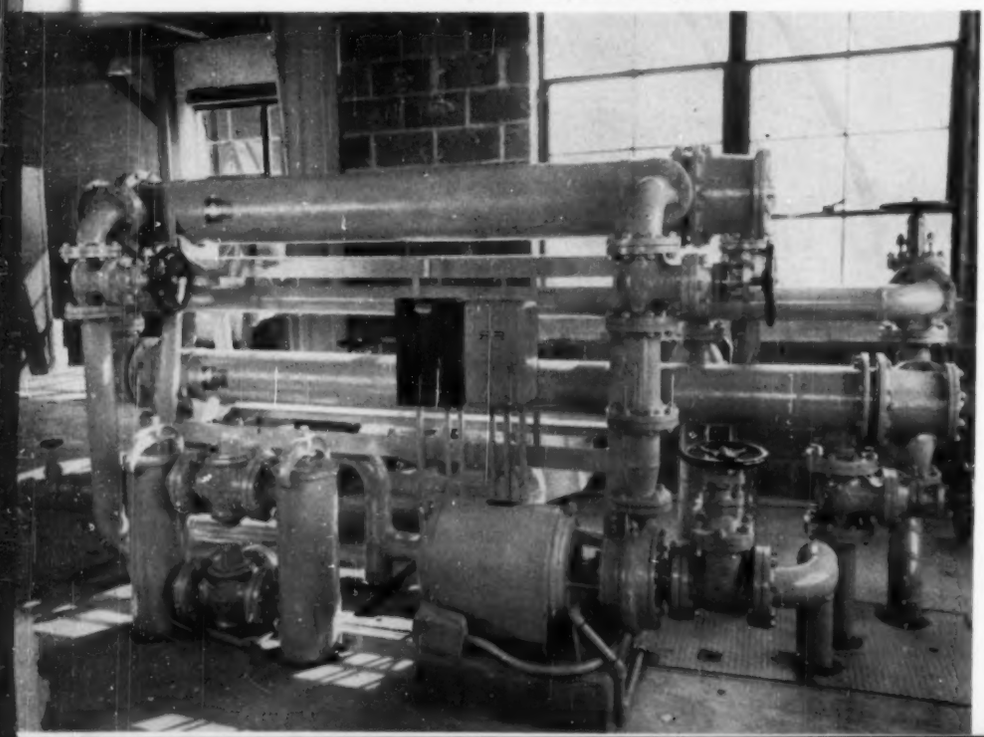
IN THE past year, the Bangor Hydro-Electric Company, serving 145,000 people over a large area of Maine, installed four Nordberg diesel engines totalling 5,700 hp. to augment its large hydro supply and insure continuation of the company's unbroken record of service to consumers under all conditions. Two more Nordberg diesel engines are on order for later installation. Located in three widely separated plants, the new engines also provide standby protection in the event of transmission line failure. The prime movers chosen for all three plants are of the heavy-duty four-cycle type, each with seven cylinders, 16-inch bore and 22-inch stroke, developing 1,425 hp. at a moderate 327 rpm. To achieve this rating the engines are equipped with exhaust-driven turbochargers. Each diesel drives directly a 3-phase, 60-cycle, 4,160-volt, 1,000-kw. generator with 20-kw. belted exciter.

The Milford plant, about 15 miles north of Bangor on the Penobscot River, is integrated with the company's big hydro plant at that point, though a separate wing was built to house the two diesels installed in this plant. Following the transmission line "down east" for about 90 miles, we find the East Machias plant on the East Machias River between Hadley Lake and the Ocean. Here again there is a hydro plant (900 kw. under normal conditions), but the diesel is housed in a separate building. Again following the transmission line north and east for some 30 miles, we come to Eastport, the easternmost city in the United States. Here the diesel is the sole power producer. Except for differences dictated by local conditions, accessory equipment and handling of fuel, lube and water are identical for the three plants. All have adequate fuel storage, four 20,000-gallon tanks at Milford and three 20,000-gallon tanks for each of the other stations. The No. 2 fuel is unloaded into the storage tanks by a motor-driven 125-gpm. pump. At Milford, it flows from storage by gravity through twin strainers and a meter into 300-gallon day tanks in the engine room and is then drawn through duplex filters to the diesel injection system by engine-driven gear pumps. There is a level gauge with low-level alarm on each day tank. The only difference at East Machias and Eastport is that fuel is supplied to the day tanks by float-controlled motor-driven transfer pumps. A similar pump is available for use at Milford should the need arise.

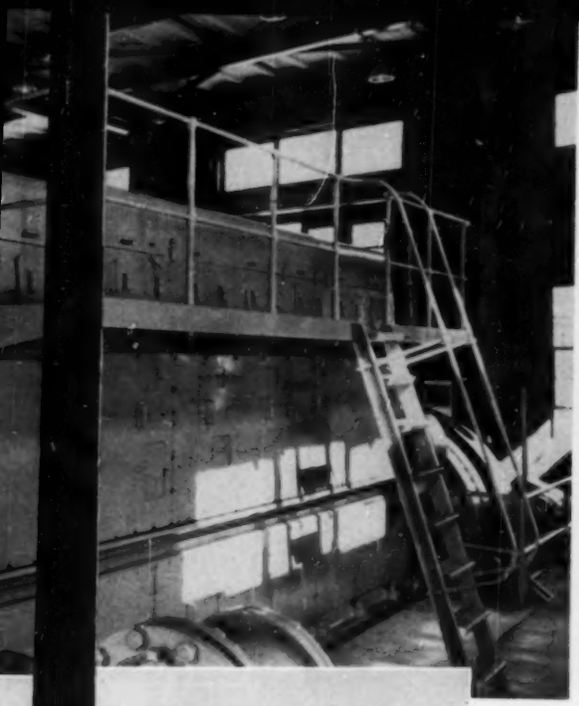
Company engineers clearly recognize the importance of keeping lubricants free of contamination. Lube oil for each engine passes through twin strainers and duplex cartridge-type filters. In addition, each power unit is served by a purifier embodying an electric heater and Fuller's earth filtration elements. A motor-driven pump draws oil from the engine sump, puts it through the purifier and returns the clean oil to the sump. All bearings are lubricated by a pressure system which also serves to cool the pistons. An oil cooler is included in the circuit. A motor-driven auxiliary pump is used before starting and after shutting down the engine and is started automatically if engine lube pressure drops. Cylinders are supplied with lube oil by separate force-feed lubricators. The cooling water handling varies from plant to plant, though in every case a closed system is employed. At Milford and East Machias, jacket water is circulated through each engine and a separate heat exchanger by a 350-gpm. motor-driven centrifugal pump. At Milford, raw water is drawn from the Penobscot River through twin strainers by a pair of motor-driven centrifugals, put through the heat exchangers and then wasted to the river. At East Machias, jacket water handling is the same but raw water is drawn from the hydro penstock, run through

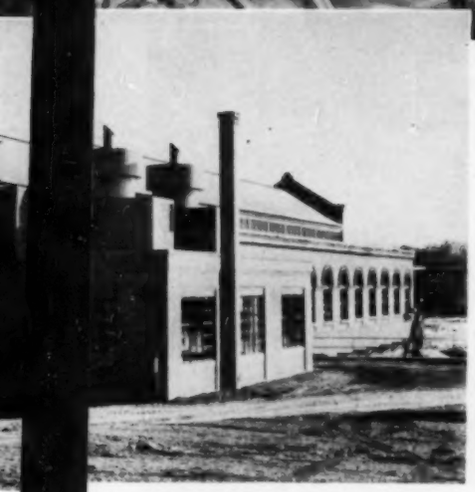


Milford plant is largest of Bangor Hydro-Electric's three diesel plants. The new building housing the diesels is in the foreground and the hydro plant and the Penobscot River



Identical accessory equipment for each engine is grouped for easy operation at Milford and at East Machias. Shown here at Milford are the lube oil strainer, the lube cooler, the lube auxiliary pump, the cooling water heat exchanger and the jacket water pump.





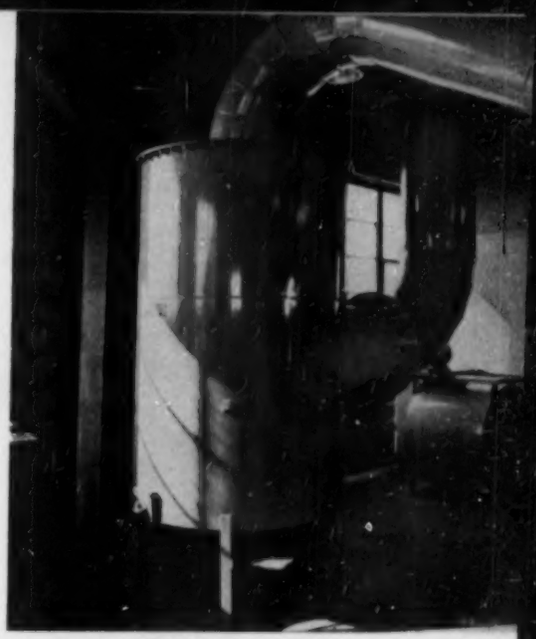
are in the background. Above—Close-up of one of the diesels at Milford shows the turbocharger, cylinder lubricators and the compact gauge panel.

the heat exchanger and returned to the river. A motor-driven centrifugal pump also can be used to provide raw water. Eastport lacks the convenient and abundant source of fresh cooling water available to the other two plants and so it was decided to use an evaporative cooler. Water is circulated through engine jackets and cooler coils by a motor-driven centrifugal pump. Automatic thermostatic controls keep water at the desired temperature by by-passing the cooler and by regulating air shutters.

Exhaust gases turn the turbocharger and then vent through vertical silencers on the roof. Each silencer is jacketed so that in cold weather engine air can be warmed before it is drawn through the oil bath filters in the engine rooms to the turbocharger which supplies air under pressure to the cylinders on the intake stroke of the pistons. This supercharging results in a 50 per cent increase in engine horsepower rating. Mounted conveniently on each engine are pressure and temperature gauges and an exhaust pyrometer. There are alarms on cooling water and lubricating oil temperatures and pressures. Starting air for all the engines is provided by motor-driven compressors automatically controlled to keep air tanks at 250 psi. At East Machias and Eastport, the compressors can also be belted to small gasoline engines. The dead-front, unit-type switchboards are well equipped and include electrically-operated circuit breakers. Battery systems at East Machias and Eastport provide power for operation of the switchgear and for emergency lighting. Each engine with its generator and exciter is mounted on a floating concrete slab supported by 16 vibro-isolators (each with nine springs) and four mechanical snubbers. Flexible joints are included in the exhaust intake air, oil and water piping.

List of Equipment

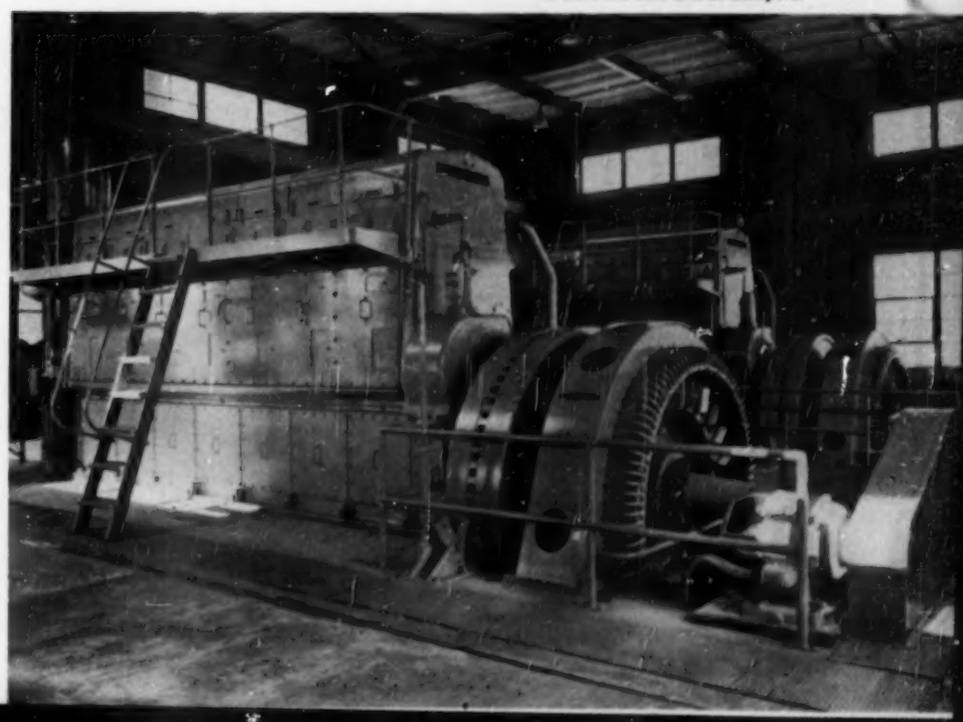
Engines—Nordberg Mfg. Co.—Four 7-cyl., 4-cycle, 16x22-in., 1,425-hp. diesels operated at 327 rpm.
Generators—General Electric Co.
Governors—Woodward Governor Co.
Starting Air Compressors—Gardner-Denver.
Evaporative Cooler—Worthington.
Heat Exchangers—Ross Heater & Mfg. Co.
Lubricating Oils—Tycol, Tide Water; Teresse, Standard Oil.
Lube Oil Purifiers—Honan-Crane Corp.
Lube Oil Coolers—Ross Heater & Mfg. Co.
Lube Oil Filters—Wm. Nugent & Co.
Auxiliary Lube Pumps—Blackmer.
Cylinder Lubricators—Manzel Brothers Co.
Fuel Oil—No. 2 Tydol, Tide Water.
Fuel Oil Meters—Buffalo-Niagara.
Fuel Oil Level Gauges—Rochester "Magnetron."
Fuel Transfer Pumps—Blackmer.
Fuel Oil Filters—Wm. Nugent & Co.
Air Filters—Cycoil, American Air Filter Co.
Turbochargers—Elliott-Buchi.
Exhaust Silencers—Maxim Silencer Co.
Alarm Systems—Viking.
Switchboards—General Electric Co.
Pyrometers—Illinois Testing Laboratories.
Pressure Gauges—Lonergan.
Batteries—Exide.
Vibro-isolators and Snubbers—Korfund.
Radio Telephones—General Electric Co.



One of the Cycoil air filters at Milford. Air for each diesel engine is drawn through an oil bath air cleaner and then to turbocharger.

Bangor Hydro Electric Co.—Diesel Engine Plant at East Machias, Me.

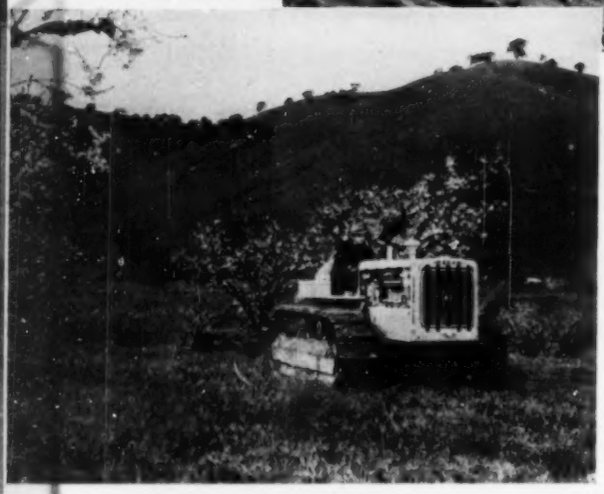
Two 1,425-hp. Nordberg diesels in Milford plant provide Bangor Hydro-Electric Co. with 2,000 kw. of dependable power to supplement the hydro supply. Similar single units are installed at plants at East Machias and at Eastport.



THE UBIQUITOUS DIESEL TRACTOR

By ALFRED A. DE CICCO

Pacific 10x60 groundplane leveling irrigated farm land near Grandview, Washington, with a Caterpillar diesel tractor owned by Balcom & Moe, Grandview, Washington.



Caterpillar diesel tractor pulling a 10½-foot Killefer disc turning under cover crop in a cherry orchard near Suisun, California, owned by G. W. Swanson.

Caterpillar diesel tractor pulling four 16-in. John Deere plows going 6 inches deep in 4th gear, plowing for feed crop for Jim Grilliot, of Syracuse, Kansas.

Harold Wooley Logging Co., of Drain, Ore., has purchased a second International diesel tractor. Operation illustrated is in the Smith River Region bringing in saw logs averaging 8,000 feet to the load.

Geo. E. Roduner, Quincy, Washington, uses this Caterpillar diesel tractor to pull a subsoiler 12 inches deep in wheat land.

A Caterpillar diesel tractor with a No. 80 scraper is used by Fiorito Bros. in road construction work near Gig Harbor, Wash.

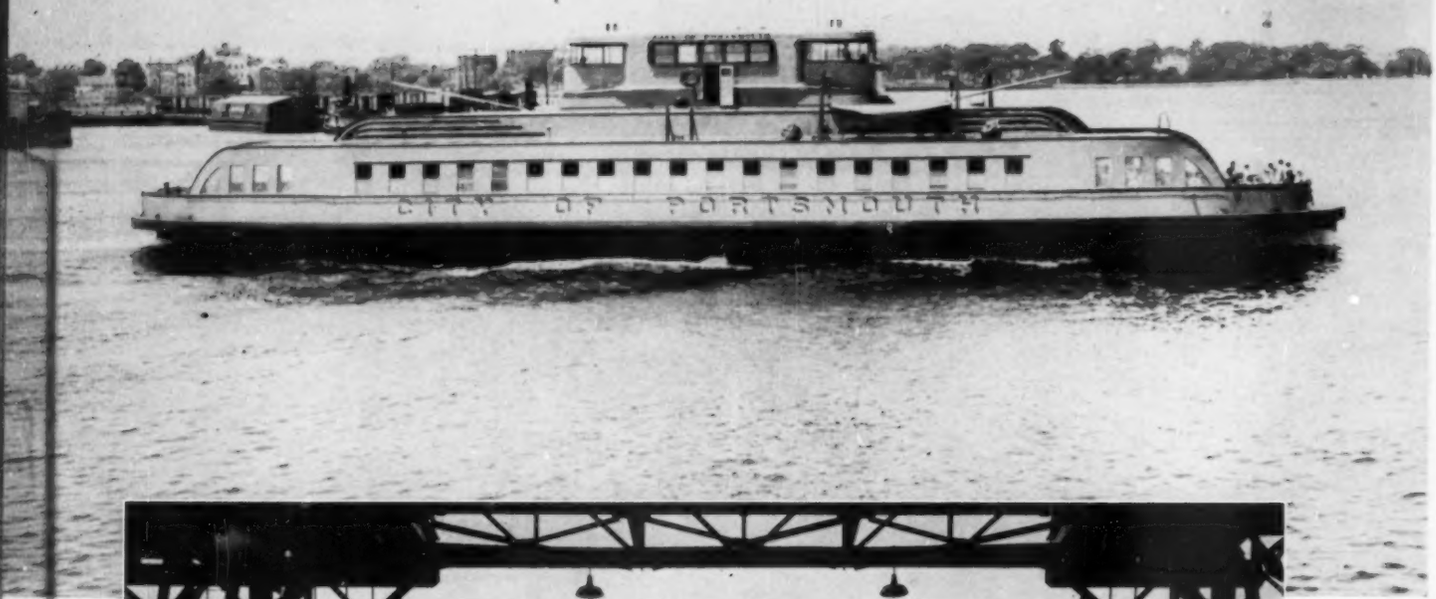
International diesel crawlers with Isaacson dozer blades doing heavy road building work for Ufford & Kinshella on Hungry Horse Reservoir contract.

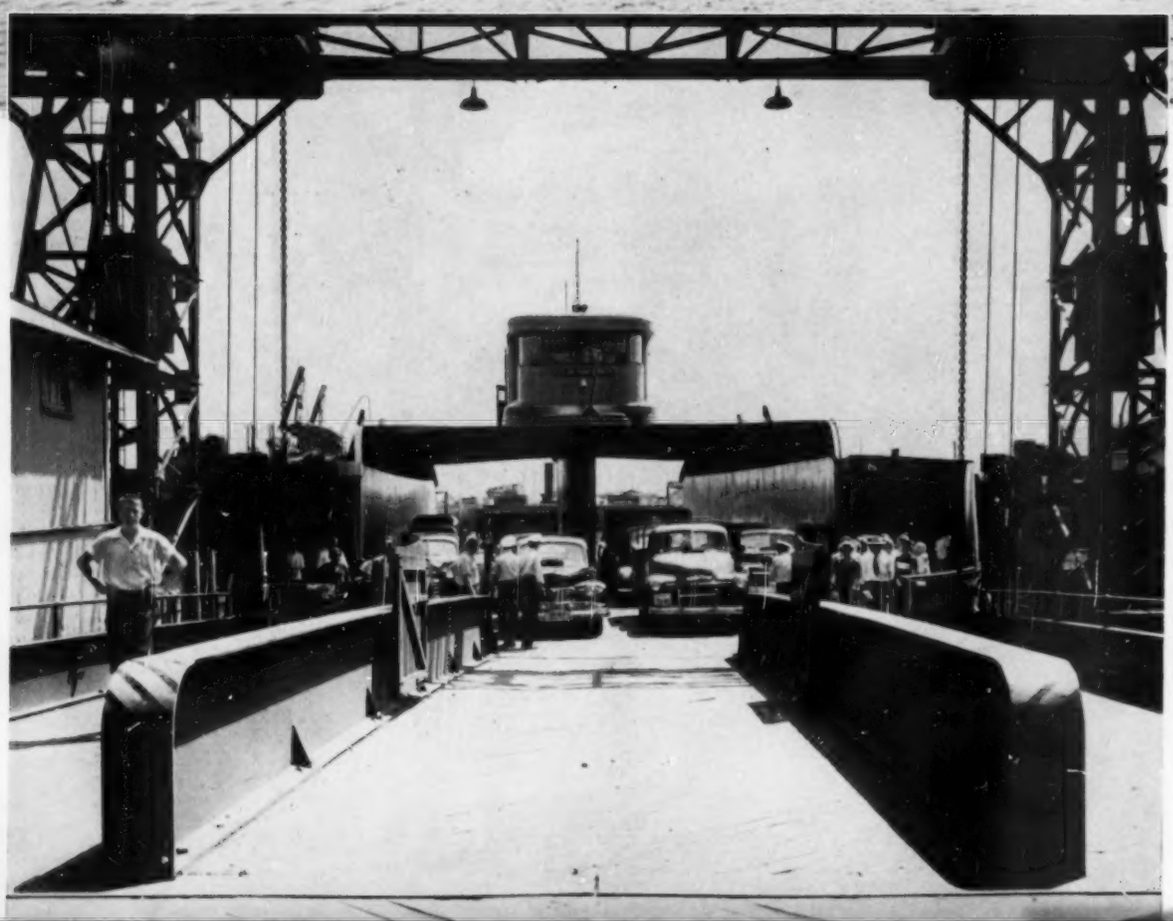
International diesel tractor doing maintenance work on Pike's Peak Highway at 11,500 ft. elevation.

NORFOLK COUNTY FERRIES DIESELIZED

From a Skiff in 1636 to Transporting Ten Million Passengers in 1949 Is Another Saga in the History of Saving Money with Diesels

By DOUGLAS SHEARING





FEW businesses in American can boast 313 years of continuous activity. But that is the actual record of the Portsmouth-Norfolk County Ferries on the historic Elizabeth River in Virginia. It is a story of continuous service and progress, from a crude skiff in 1636 to the present fleet of seven ferries, five of which are diesel-powered, including two trim new ones—two of the most modern diesel-electric ferryboats to be found anywhere in the world. It is an amusing note that in the first year of operation, from 1636 to 1637, facilities were more than tripled. The small skiff, established by one Colonel Adam Thoroughgood, grew to three handpowered ferries, supported at public expense by a tax levy of six pounds of tobacco on each tithable person. During the hundreds of eventful years thereafter, the ferries were variously operated by state government, by private interests under government lease or franchise, and for several years by the Federal government following evacuation of the area by Confederate troops and again during World War I.

Since 1920, however, the ferries have been jointly owned and operated by the City of Portsmouth and the County of Norfolk, authorized by special act of the General Assembly of the State of Virginia. As might be expected, propulsion methods have been no less varied. First there were the hand-powered boats. Next, and doubtless a great step forward, came "team-boats" — "commodious" ferryboats powered by blind horses or mules, much the same as threshers were formerly run. Then came steamers, followed, of course, by diesel engines. Today, the ferryboats operate day and night on regular, continuous schedules between the business areas of the cities of Norfolk and Portsmouth, a ⅞-mile trip. Some idea of the activity and importance of this ferry service can be gained from traffic figures. During the war-time peak year, the Portsmouth-Norfolk County ferries carried 20,350,000 pedestrians and 2,772,000 vehicles. Considered essential, they were given high priority. In normal times, as at present, the ferries annually transport from eight to ten million passengers and from one and a half to two million vehicles ranging from passenger cars to the largest trucks and buses. The company has its own well-equipped machine shop, woodworking shop and other facilities for the structural and mechanical maintenance of floating equipment and shore properties. These facilities are entirely adequate for extensive repairs and reconditioning as required. The overall operation, ashore and afloat, requires some 250 regular employees.

Four boats are kept in continuous operation 20 hours a day, with a fifth boat added during rush hours. Normally a boat leaves each city simultaneously, passing in mid-stream, while another boat in each city is loading. The ⅞-mile crossing takes five to six minutes and a boat leaves each city every six minutes. In view of this schedule, each boat easily makes one round trip or two single trips every twenty-four minutes. Thus each boat makes five single trips per hour, or a minimum of 100 trips per day. With a tight, fast, short-run schedule like this, the importance of maneuverability and speed in getting into and away from the docks can be appreciated. Responsibility for the highly successful operation of this ferryboat service rests largely on the capable shoulders of Superintendent Chas. O. Freund, as it has for the 29 years of Portsmouth-Norfolk County ownership. Mr. Freund, shrewd in analyzing his needs and the most effective means of meeting them, has sparked the company's progressiveness and extensive modernization programs. Moreover, he has himself instigated several new and interesting innovations in ferryboat design and operation which are described later in this article.

The 19-year-old *City of Norfolk*, built in 1930, was the first of the Portsmouth-Norfolk County Ferries to be diesel-electric powered. Going on her 20th year of virtually continuous service, averaging at least 100 trips per day, she will have made roughly 720,000 trips—a total distance of 630,000 miles! Despite the nature of the service, the vessel's diesels, a pair of Cooper-Bessemer engines, did not receive their first major check-up until after thirteen years of operation. There was little evidence that it was needed. The pistons, rings and liners showed so little wear all were put back in. The next major inspection came four years later, after a total of seventeen years of almost continuous 20-hour-a-day operation. Heads were of course washed out, valves ground, connecting rod bearings rebabbitted, grommets and gaskets renewed and, finally, new rings installed, although wear still was so slight it was hardly deemed essential.

During all those years, and to date, there has been no lost time except for routine servicing and inspection—a record of stamina and trouble-free performance that is a credit to the diesel industry. As a result of this remarkable engine performance, as well as substantial fuel and operating economies compared with steam, all four ferries added since the *City of Norfolk* are diesel powered. These are the *Berkley*, a smaller vessel used on a separate run, and powered by a single direct-reversing Fairbanks-Morse diesel; the *Great Bridge*, now powered by two Cooper-Bessemer JS-6 diesels; and the two latest diesel-electric ferries, the *City of Portsmouth* and the *Norfolk County*, each of which are likewise powered by a pair of Cooper-Bessemer JS-6 diesels. The two remaining older vessels, powered by reciprocating coal-burning steam engines, are the *Gosport* and the *New York*, the latter a veteran side-wheeler now virtually retired.

The operation of both steam and diesel-powered vessels in identical service and over a period of many years has afforded an excellent opportunity to make direct comparisons of operating cost and behavior. The figures leave no doubt as to the overwhelming economy of diesel power in this and similar service. For example, the *Gosport*, most efficient of the present as well as past steamers, shows an average hourly operating cost of $14.31, including cost of crew, fuel, lubes, water and all supplies. For the 20-year-old, diesel-powered *City of Norfolk*, the average hourly operating cost comes to only $9.23. Thus, based on a conservative 8,730 operating hours per year, the saving made possible by diesel engines easily exceeds $44,000 per vessel per year in operating cost alone. With savings like this, the total cost of new diesel-powered vessels is repaid in a very few years. Thus the two new diesel-electric boats recently placed in service by Portsmouth-Norfolk County Ferries have

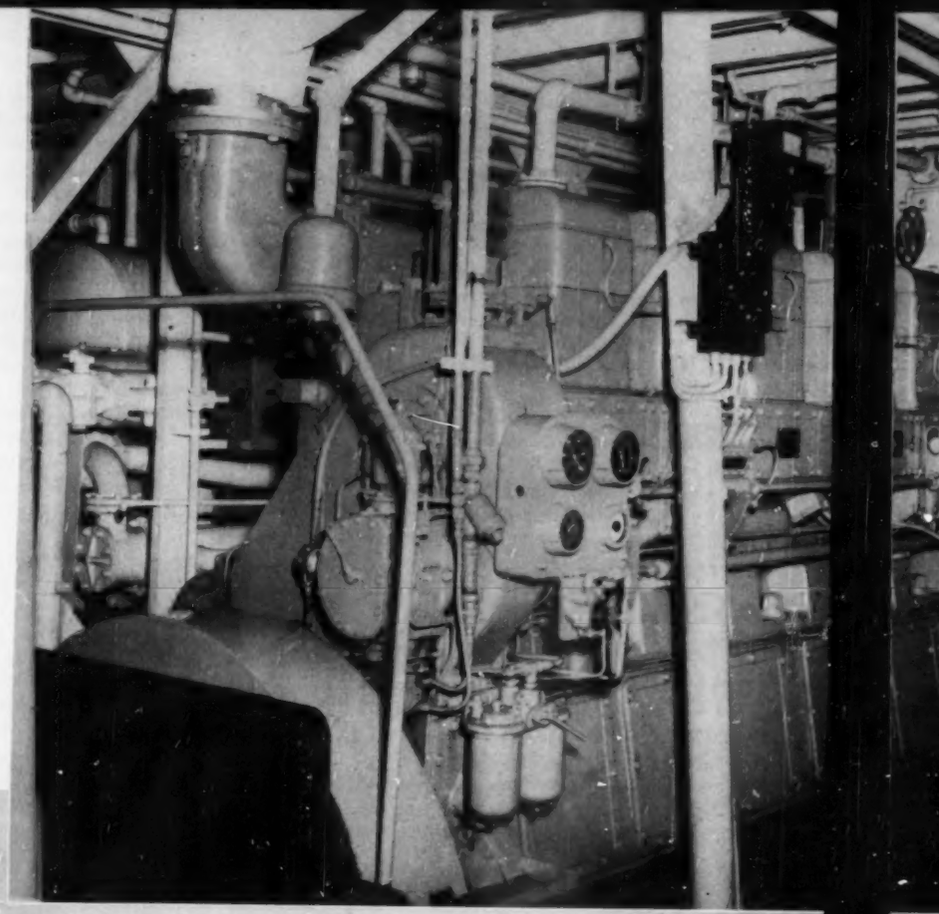
Nineteen-year-old Cooper-Bessemer-powered *City of Norfolk*, line's original diesel-electric ferry, which has logged a remarkable record of high availability and low maintenance during 63,000 miles of travel.

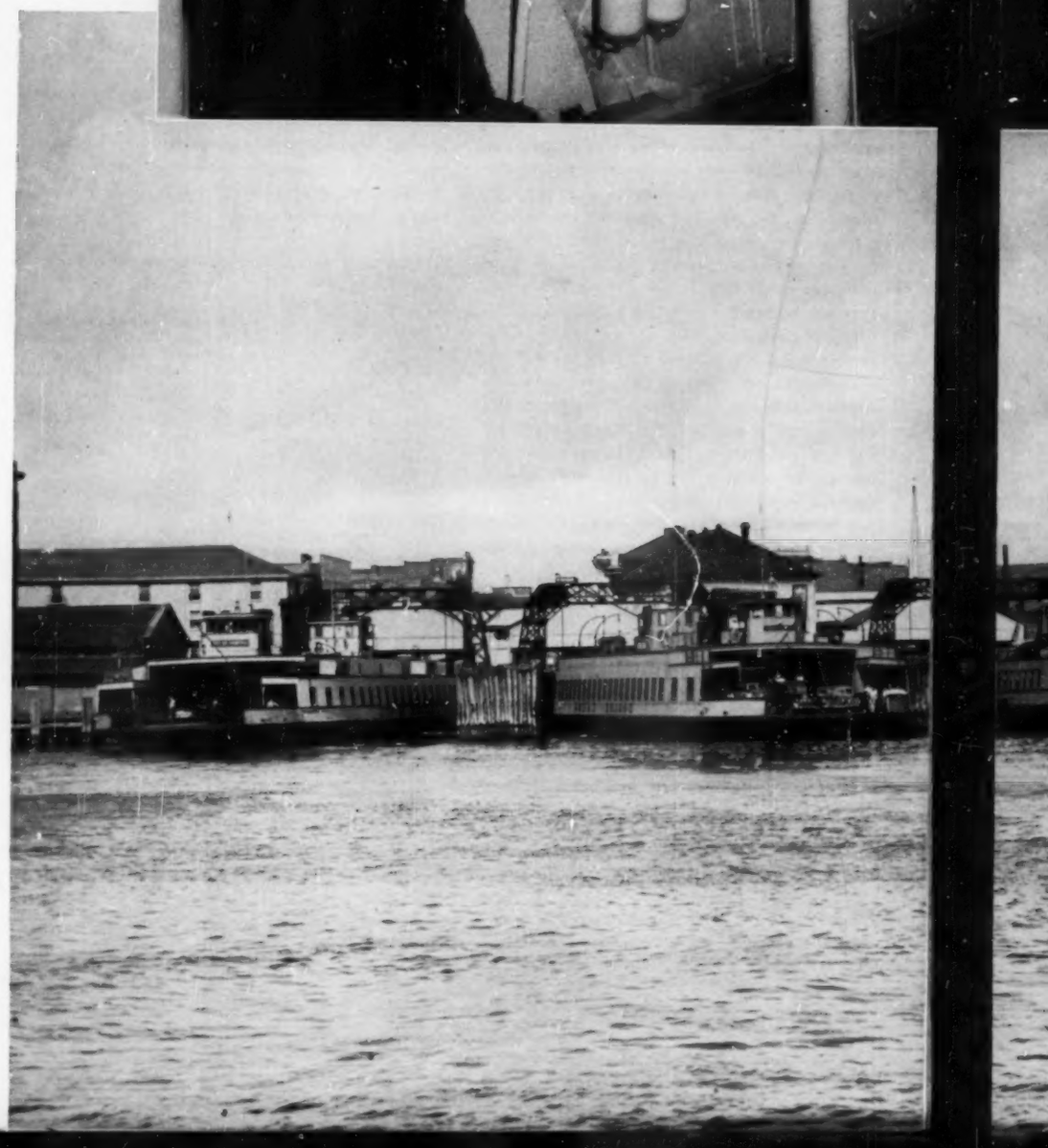
***City of Portsmouth*, one of the two new sister ferryboats recently added by Portsmouth-Norfolk County Ferries. Note single, double-end pilot house and other design simplifications compared with older type boats.**

already retired two steamers. It became obvious, as advocated by Superintendent Freund, that the continued use of the steam-powered boats, even though entirely serviceable, was economically unsound.

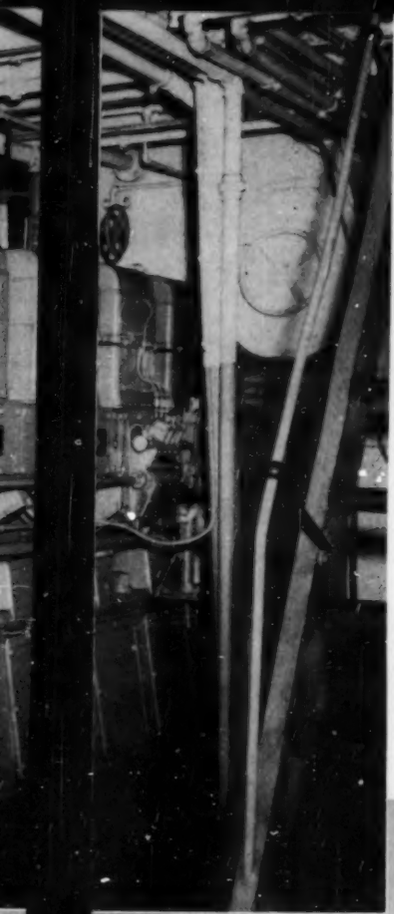
The new sister ferries, *City of Portsmouth* and *Norfolk County*, each accommodating some 35 to 40 vehicles and from two to three hundred pedestrians, were placed in regular service this summer. The boats are 180 feet in overall length, with a beam over the guards of 59 feet. Beam of the molded hull is 45 feet and molded depth 15½ feet, with a designed draft of 9½ feet. Gross tonnage is 775. The ferries were built in the shipyards of the John H. Mathis Company, Camden, New Jersey, and were designed by Naval Architect Eads Johnson of New York to meet precisely the particular service requirements of the Portsmouth-Norfolk run. This necessitated design and proportioning exactly suited to the three regular service docks at each city, as well as capacity for maximum vehicular and pedestrian traffic within this and other limitations. It also required a propulsion and control set-up that would provide economically the extreme flexibility, two-direction maneuverability and speed in and out of the docks so essential for the fast, short-run schedule. As in the older ferries, each new boat has a single propeller shaft extending the length of the vessel for traveling in either direction with equal ease and speed. At each end there is a four-bladed 7-foot 9-inch propeller with 7-foot 2-inch pitch. Propulsion power is furnished by two 580-hp. Cooper-Bessemer diesels, each direct-connected to a 350-kw., 250-volt d.c. General Electric marine generator. These main generators supply current to two separate 400-hp. G.E. propulsion motors which drive the shaft through Farrel-Birmingham reduction gearing for a propeller speed of 200 rpm. A 24-kw. auxiliary generator and 3-kw. exciter are belt-connected and mounted above each main generator. Incidentally, 78 per cent of normal speed can be maintained while running on only one engine. Thus minor repairs can be made on any part of either propulsion unit without removing the vessel from service.

One of the new, perhaps unique features instigated by Superintendent Freund, and subsequently engineered by General Electric, permits exceptional acceleration from a dead start at the docks. Using a special system of controls, greater horsepower can be delivered at the intial turn of the screws than is ordinarily possible, without danger of damaging the propulsion motors, and propeller speed can be built up to the full 200 rpm. in much less time. The unusual speed with which the new boats pull away from the docks is readily apparent compared with the other ferries, particularly the steam-powered vessels. The second novel feature, also instigated by Mr. Chas. O. Freund, and well executed by Designer Eads Johnson, combines the two ordinarily separated pilot houses into a single streamlined unit but with full duplicate control





View of docks on Portsmouth side with three of the five diesel-powered boats tied up. One of the two new streamlined vessels is on the right.



These two 580-hp. Cooper-Bessemer JS-6 diesels, driving G.E. 350-kw. generators, power the new ferryboat, *City of Portsmouth*. The set-up is the same in other new boat, *Norfolk County*.

facilities of power and steering at each end. Thus a pilot can go from one station to the other, as trip direction changes, without ever being exposed to the weather or hazardous conditions. The space between the control stations is well utilized by the connecting passageway, lockers, snack table, and an elevator, which is a unique ferryboat feature.

In keeping with the clean-cut "new look" design of the pilot house, and contributing to the trim appearance of the new boats in general, the stacks are completely hidden and the engine room ventilators are concealed at the base of each end of the double pilot house. A comparison of the accompanying photos of the original diesel-electric *City of Norfolk* and the new *City of Portsmouth* make these an dother modern design refinements immediately apparent. As mentioned, the vessels have full pilot house control of propulsion power and steering. Pilot house equipment also includes an intercommunication system, a switch panel to control the running lights, and Sperry rudder angle indicators. A new and highly advantageous feature is the exceptionally wide angle of visibility with a notable absence of blind spots.

Reference was made above to the elevator with which each of the new ferryboats is equipped—another new and unusual feature for which Superintendent Freund is responsible. These are electrically operated, serve-self elevators, powered from the auxiliary generators and available at all times to any crew member, official or visitor authorized to go from the passenger deck to the pilot house, or vice versa. This, however, is truly a major boon to the quartermasters, who would otherwise have to make the trip up and down by ladder at the terminus of each single trip. For example, on the older vessels this means 17 feet of ladder travel ten times every hour during an eight-hour watch—actually equivalent to a daily climb up the Empire State Building! Quite an energy and time saver aside from its safety value, believes Mr. Freund. Still another highly advantageous feature sponsored by Superintendent Freund is a new layout for the main vehicle deck permitting virtually 100 per cent use of the deck area. On the older vessels, a stanchion is located midway in the tapering area at each end of a vessel. By repositioning these stanchions, moving them back several feet toward midship, from two to four additional vehicles can easily be accommodated. Considering the volume of traffic handled in a year's time, this is obviously a highly profitable revision of design.

Unlike so many private and government owned transportation facilities, the Portsmouth-Norfolk County Ferries are profitable—a completely self-supporting operation. In these times of rising prices, it is particularly significant that the fare remains at 5 cents per crossing, as it has for years, despite a payroll now 125 per cent higher than before the war. This is, of course, a tribute to excellent, progressive management, responsible for taking advantage of the most efficient powering methods and other important economies in overall operation. It is the reason why the Portsmouth-Norfolk County Ferries are known not only as the first ferry service in America, but also as one of the best operated ferry services on the Atlantic or Pacific Coasts.

One end of unique double pilot house designed for newest Portsmouth-Norfolk County Ferries. Note wide angle visibility and complete absence of blind spots.

AND NOW IT'S DIESEL ELECTRIC SNOW PLOWS

By CHARLES F. A. MANN

THEY said it could never happen! Steam and snow and snowplows and snowdrifts piled on steel railroad tracks were as inseparable as the well-known circus people from Siam. The cozy, wasteful steam boiler, the clanking reciprocating engine and the work-train minded crews would never be replaced by anything as modern as a diesel drive, even from the very technological reasons for snowplows in the first place. So it remained for America's diesel railroad pioneer, the Chicago Burlington & Quincy, to move the modern form of rail power into one more field long held sacred to steam.

The Burlington runs mainly through the heart of the continental snow-drift belt, where a 6-inch fall of dry snow can pile drifts 30 feet high in a wild wind in a matter of hours, particularly in the western plains country where snow and sand roll aimlessly and freely in winds from many directions. The mountain country farther west is the snow-slide country, but not the snowdrift country, and normally, snow removal presents a serious problem that requires skill, manpower and machinery in quick doses to keep single track main lines open in storms. America's successful tool in the battle of snowdrifts is our home-grown rotary snowplow, with a huge variable-pitch steel-bladed rotor mounted on a heavy shaft, ahead of a short car-body equipped with power plant and a sort of glorified pilot house for the operators to navigate the machine. The rotor is generally about one foot wider than permissible rail clearance widths, encased in a shroud that will pass a normal engine and string of cars.

Heretofore a steam-fired miniature donkey boiler and either single or multiple reciprocating steam engine drive, with water and fuel tanks, and generally a water tender behind, all pushed by a locomotive of sufficient power to cope with the size, density and general conditions of drifting peculiar to location, profile of track and wind conditions. The worse the conditions the bigger the pusher locomotive. Actually, for swift clearing of track, it is customary to use the biggest pusher engine and constantly raise the power output delivered to the rotor shaft. Of late years it has passed the 1,000-hp. mark and may hit 2,000-hp. if speeds and requirements show that that much power can be efficiently used on the snowdrifts. Steam rotaries are already near 1,500 hp. The Burlington took the logical way out by creating a diesel-electric snowplow. Instead of worrying about the source of power, they viewed the unique torque characteristics and the quick reversing possibilities of electric drive, plus compactness, as the primary factors in deciding on a rotary plow with electric drive. Power supply is simple when the railroad is willing to use a $550,000 4-unit 6,000-hp. diesel locomotive to push a snow plow. Simply use one of the four units of the locomotive as an electric power plant, and disconnect the traction motors, thus making the road engine a 4,500-hp. job and a 1,500-hp. powerhouse for the plow.

The Burlington diesel-electric snowplow extends the interchangeability of parts from their locomotive roster by means of a completely rebuilt converted ALCO steam snowplow unit. It is 16 feet high, 36 feet long and weighs 91 tons. The rotor blade is 11½ feet in diameter, equipped to turn in either direction and with exceedingly rapid control and maneuvering characteristics. The entire unit is of welded steel construction, snowproof, and equipped with powerful running lights, oil heater and AB braking for use on mainline trains when going to and from the point of use. A telephone communication system between the plow operator and the locomotive engineer keeps both in close touch. The rotor is driven by an extension shaft from the main body of the cab, and operates in either direction by means of four regular freight diesel locomotive traction motors, fitted so as to permit quick removal and use as spares or replacement with any other locomotive traction motors from standard freight units. Forced air ventilation is fitted so the units can be removed easily.

The entire conversion was made in the Denver shops and the unit is so easily put into service that it can be quickly coupled at the head of a freight train with a 4-unit diesel locomotive, the connecting cables hooked up and the entire train proceed as usual, where conditions require light plowing and will not unnecessarily drag the locomotive and cars. Often a complete worktrain unit will not be needed with this system, and in case of a sudden short snowdrift, the locomotive can proceed detached from the freight train, for short distances, then couple on and proceed to a point where the plow can be detached.

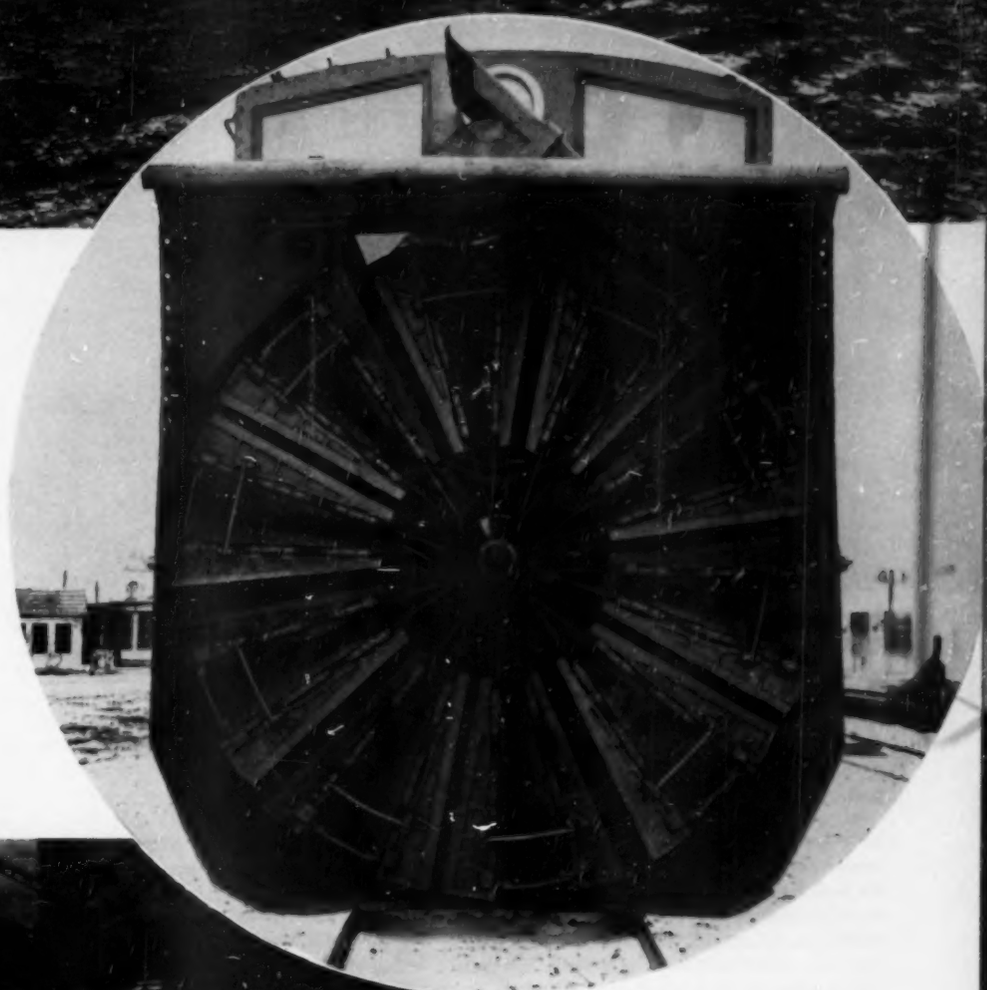
The rotor operates at 130 rpm. at plowing speed and 80 rpm. when idling. With steam power it had twin 500-hp. engines, but seldom developed over 600 or 800 hp. The four geared motors are excited from a 10-kw. generator normally, but where quick maneuvering is required, additional excitation current from a storage battery is used for the motor field circuit. On the opposite power shaft is a blower with 6,000 cfm. capacity for driving motor ventilation, an ingenious two-unit arrangement that will automatically deliver full power on the blowers regardless of which direction the plow rotor is turning. One operation clockwise and the other counter-clockwise with an automatic damper setup to cut in or out either blower. This is necessary to permit the plow rotor to throw snow to either side of the track, instantly. The operating cab has seats for two persons besides operator.

Total cost is low because the power units are actually "borrowed" from the inventory of traction motors, for use during the short snow season, thus cutting down the idle time of the heavy investment. All mechanical and electric parts are protected by circuit breakers, and weathertight cables to the diesel locomotive can be hooked up from dead stop in 30 minutes. The relative efficiencies of the electric plow and the diesel locomotive are relatively unchanged by cold weather. The colder the weather and the worse the storm the better the diesel-electric snowplow works.

The Burlington has long fought the worries of coal fired steam plows, cleaning fires, boilers and lowered efficiencies of the old way of running rotaries. Now they have evolved the plow design that will work for a week at a stretch without stopping, if necessary, using two crews and arranging for additional fuel supply for the diesel locomotive to be brought up if necessary. Repairs can be cycled in with regular motor overhaul practice, and parts borrowed at will from any convenient diesel.

So-o-o-o, the diesel generating set on the old time worktrain boarding car is about all that's left to "Go Diesel" on the railroads. The Burlington has done it again!

Diesel electric rotary snowplow on the Burlington Lines with four-unit diesel electric pushing locomotive behind.



Business end of the Burlington diesel electric snowplow which rotates in either direction at the will of the operator.

Interior of the cab, speaker at upper left with attached microphone, supplies continuous communication between plow operator and locomotive engineer.

DIESELS FILL CALIFORNIA SUGAR BOWL

Mechanization of State's Beet Farming Is So Near Completed the Problem Now Is How to Sell Housewives On Quality of Products Compared to Cane Sweetness

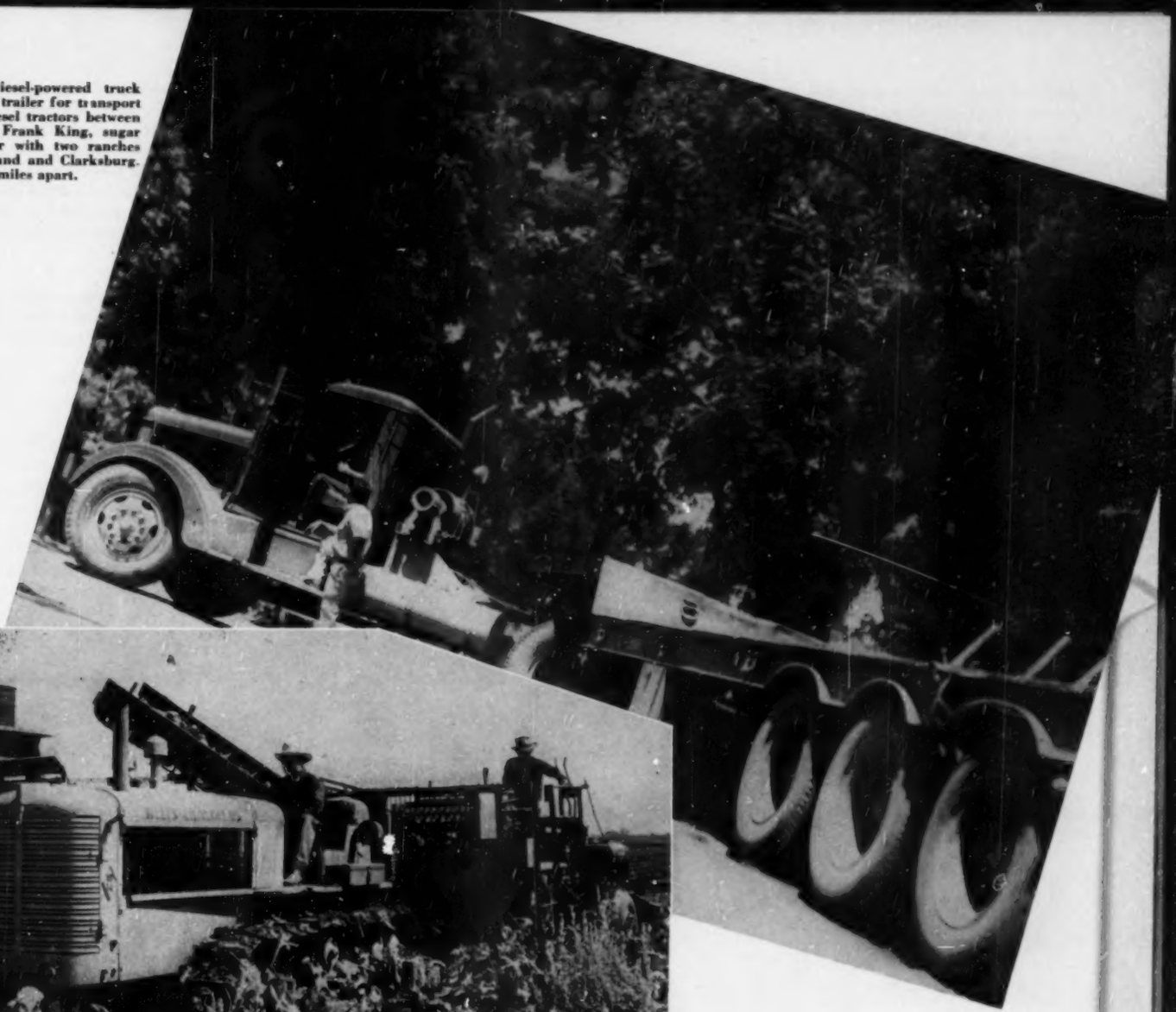
By F. HAL HIGGINS

Spreckels' modern beet sugar factory at Woodland, Calif.

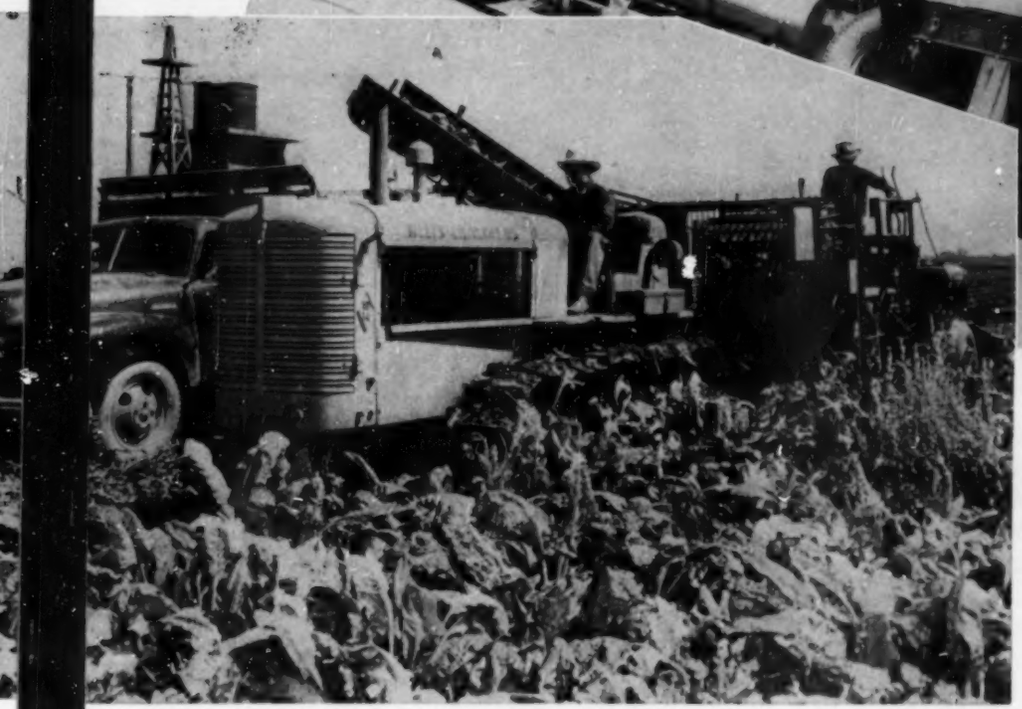
THE beet sugar industry of California has suddenly changed its tune from mechanization to marketing. The recent annual meeting of the California Beet Growers' Association in San Francisco keynoted this shift in a united drive to reach certain long sought goals. Instead of the cry for more and better machines to solve seeding, thinning, weeding and harvesting, the program practically ignored mechanization. Instead, the 1950 program accented the need for the enlargement of the market for the big sugar crop being annually produced from California beets in the face of both population rise and increased live stock as growing home markets for both by-products and the refined sugar. This changed sentiment marks a milestone in sugar beet farming, processing and marketing in California. And the success of the California beet sugar industry from processor down to farmer is a story of scarcely more than a decade of mechanization in which the diesel tractor has played a major role in tooling up California's irrigated agriculture for big results. The economical diesels have become standard power for all seedbed and harvest jobs to do the work so much better and at the exact time it should be done that both beet and sugar tonnages per acre have doubled in recent years. Not only was more work done per man and done better and cheaper than ever before, but the farmer could and did hire more skilled operators to run and service his tractors and tractor-pulled equipment, especially the harvesters as they were developed and perfected in the California beet fields over the past seven or eight years.

Sugar beet growing and processing in California goes back to about 1869-70, when the plant at Alvarado, on the east fringe of San Francisco Bay, was erected and a lot of pig-tailed Chinese laborers were employed around the plant for the heavy wheelbarrow work. The oriental hand labor had been imported in large numbers to build the early railroads and mine and irrigation flumes and ditches. The sugar beet had lots of ups and downs in pioneer days with one factory being built to extract sugar from melons. According to Gordon Lyons, Executive Secretary of the California Beet Growers Association, Ltd., 1949 set all-time records for yields of both beets and sugar per acre on 134,667 acres harvested. And those harvested acres were garnered so rapidly and efficiently that there was no loss from a late season dragged out into wet weather. Says Lyons: "There it is—another all time record! Almost sixty 100-lb. bags of sugar per acre! Fifteen years ago the average was less than forty bags per acre! Truly remarkable progress and an eloquent testimonial to the fine efforts of the technologists in developing better and more efficient practices, and the intelligent application by growers of those discoveries. Yes, our industry has indeed come a long way in a comparatively short time, and we can confidently look forward to comparable achievements in the future."

The writer, who has watched fairly closely the sugar beet farmer and his close partner, the processor, over the past 22 years, can recall when the sugar beet was looked upon as one of those bent-back slave labor crops with a lot of social problems that made it very unpopular in many U. S. areas. The sugar beet called for an army of migrant labor—usually foreigners of Mexican or Oriental origin. One University of California agricultural college dean spoke of the sugar beet as one crop he didn't think California should grow because of the social problems that went with an army of hand labor



Cummins diesel-powered truck with special trailer for transport of heavy diesel tractors between ranches of Frank King, sugar beet rancher with two ranches near Woodland and Clarksburg, 20 miles apart.



Allis-Chalmers HD14 (GM 2-cycle diesel) tractor pulling 2-row Marbeet harvester in Salinas Valley. Tractor sold and serviced by E. C. Livingston Co., dealer in Allis-Chalmers diesel tractors and engines at Salinas, King City and Paso Robles, Calif.

working for low wages and living in sub-standard shacks not fit for American labor. He put cotton in the same class, both being associated with low standard labor and social problems. But, about 20 years ago, the beet sugar processors, who had always had to sell their farmers on growing enough beets to make the operation of their factories profitable, began to do something about mechanization of the farming end of the beet sugar industry. They began pestering the tractor and farm machinery manufacturers to cooperate in working out beet harvesters to cut hand labor and length of harvest season. The same year that one of the leading crawler tractor builders began shifting from gasoline to diesel power, the Great Western Sugar Co., Denver, approached this tractor builder with a suggestion that there was a lot of business for crawler diesel tractors in beet sugar farming if this crop were mechanized with harvesters to put the crop securely and profitably in the U. S. farming system in those areas of the northern, mid-West and West Coast states where climate and soil were suitable for beets. The agricultural engineers in the tractor company were interested but the depression slowed down any new ventures into the farm field at that time. From then on, as the diesel tractor came into the farm scene, beet sugar farmers began buying them as fast they appeared to cut deeply costs of plowing, disking, furrowing for irrigation and harvesting. The ingenious California farmers, who already knew the place of crawler tractors, rapidly adopted the new sugar beet practices being worked out under Prof. Roy Bainer at the University of California in cooperation with U. S. Department of Agriculture engineers at Ft. Collins, Colorado. This mechanization program came in the past ten to twelve years after the processors had put up a fund to hand to the University of Californit, Colorado State College and USDA engineers in a cooperative effort. Under the determined and practical guidance of Prof. H. B. Walker, at Davis, Calif., a staff of engineers led by Prof. Bainer doggedly set to work to check over everything that had ever been done in the beet areas on harvesting, thinning and weeding machines. They then looked at the sugar beet and its problems as engineers and settled down to a battle to conquer the heretofore unconquerable. By the start of World War II,

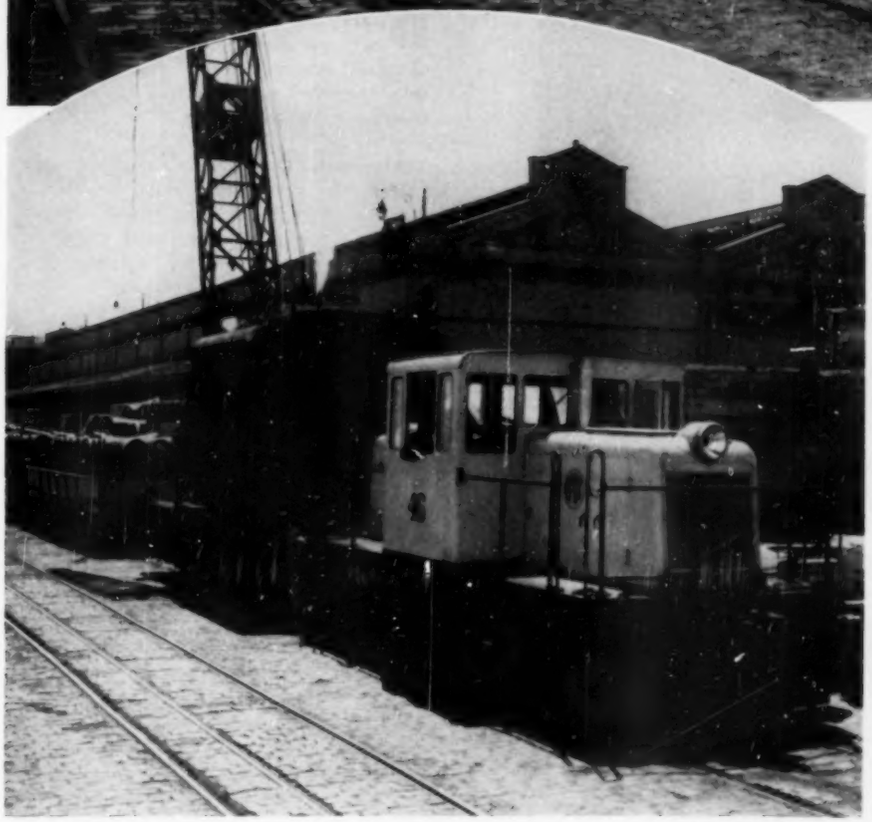
they had made some progress. But their beet growers were also hammering at the problem on a "mechanize or else" program in their own fields and shops. "Al" Jonganeel, a farmer with a university degree and a mechanical inclination to solve the problems not yet solved for his crops, precipitated the beet harvester problem in the fall of 1942 when he found war labor shortages and a beet crop to be harvested colliding with his plans. Jonganeel went to his local blacksmith and told him to build a beet harvester that would get his crop harvested in one trip through the field. The pile of junk assembled from the blacksmith shop "bone yard" along the lines suggested by Jonganeel worked from the start. Pulled by an International diesel tractor owned by Farmer Jonganeel, it caught on from the start in spite of a hatful of bugs that had to be worked out in the field by individual growers and their skilled operators and shop men in the Sacramento, Salinas and Imperial Valleys.

The diesel dealers in tractors in the beet areas were magnificent in this war crisis in helping Blackwelder's little factory at Rio Vista and the beet growers who were buying and renting the Mar-Beet harvesters. George Gordon, International dealer at Rio Vista, liked the machine and men who built it so well after watching the harvester at work that he helped organize a company of seven men with enough capital, shop and know-how to launch a little factory to build, service and develop the machine with himself acting as sales outlet. Thus, the veteran hardware and farm machine man kept the new company and its revolutionary machine on safe and sound ground without overselling and outgrowing its market. It was first sold to the beet sugar factories—Spreckels, Union, Holly, American Crystal—and these processors set up their own service and repair departments to keep the machines operating to get the beets harvested. International dealers at Salinas, Woodland, San Jose, Stockton, Rio Vista, Hayward, Tracey, Sacramento, Oxnard, King City, El Centro, Chico, Hollister and lesser spots in the beet area did the heavy service work of keeping the big harvesters going in their territories. George Gordon knew his associate dealers and how to work with them to get top service results on a new machine that called for lots of service as well as the comparatively fool proof diesel power of the big TD14's that pulled the two-row harvesters and the IH gas engine on the two-row job that powered the elevators and other mechanisms as the tractor moved the heavy machine through the field to lift, top, and load the beets.

Prof. Roy Bainer, who followed the beet mechanization in all its phases both in the Agricultural College shops at Davis and trials of both experimental machines from college as well as the machines put out by the Blackwelder factory at Rio Vista, paid a high tribute to the beet farmers and their skilled operators and shop men who frequently worked all night on a beet harvester in order to have it ready to put in a full day of harvesting the next day. "The bull-dog tenacity and practical farm know-how of those fellows in the ranch shops simply would not be denied in making this machine work when it was handed them under war pressures when still in an early development stage," said Bainer. "Both farmers and their operators and shop managers paid no attention to hours, holidays and Sundays in order to make the machines do what they had to do to keep the farmers raising sugar beets under wartime labor shortages."

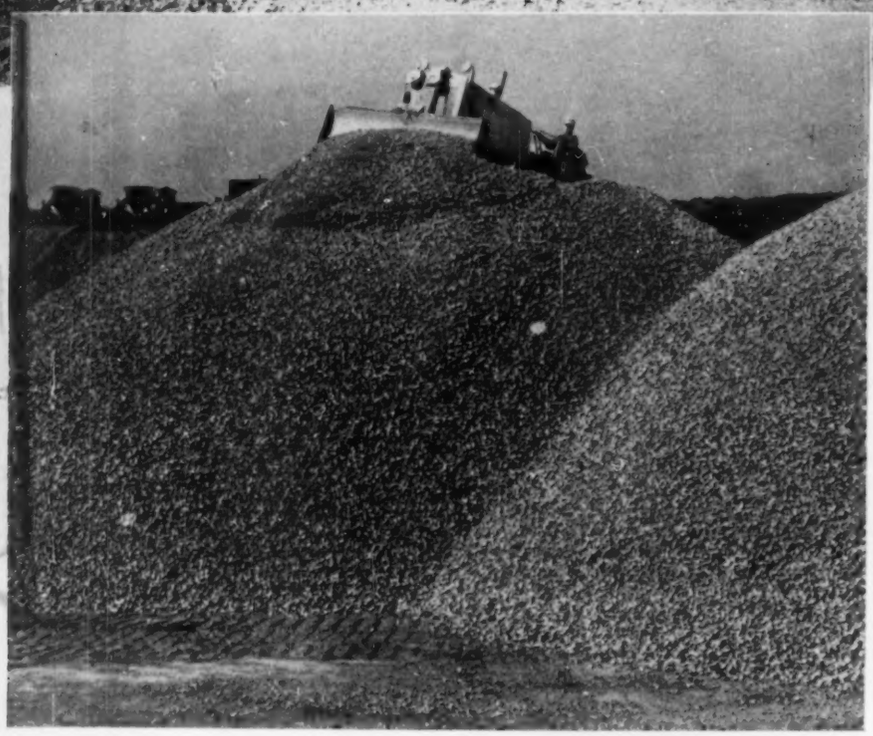
Special diesel (Cummins engine) Sterling truck with tanker trailer hauling fertilizer in liquid form to be applied by plane to crops in Imperial Valley where "Winter Beet" is grown to supply the new Holly $6,000,000 processing plant between Imperial and Brawley.

Filling up with diesel fuel at the ranch tanks on the Frank King farms 8 miles northeast of Woodland in the Sacramento Valley. The King ranches own and operate a big fleet of diesels—International wheel, Caterpillar crawlers, both IH and Cat diesel pumping engines, and Cummins-powered heavy truck for moving crawler tractors from ranch to ranch.



DIESEL-ELECTRICS ON RIO DE JANEIRO DOCKS SAVE $81,000

AN estimated $81,000 will be saved annually in fuel costs alone through the use of eight General Electric diesel-electric switching locomotives, for the Administracao Do Porto De Rio De Janeiro. The locomotives, six 45 and two 65 tonners, replaced steam motive power in October, 1948. Fuel consumption performance records show that annual fuel savings will average more than $10,000 per unit. At this rate, officials estimate that the switchers will pay for themselves out of fuel savings in about three and a half years. Average fuel consumption for the 45-ton units has been 1.47 gph. of operation; for the 65-tonners it has been 2.76 gph. For one period, the number of locomotive hours was increased about 49 per cent over the old steam units, yet total fuel cost was 41 per cent lower. Officials of the Administracao Do Porto estimated that if locomotive hours had been the same, comparing the new G-E diesel-electrics to the old steamers, total reduction in fuel cost would have been around 61 per cent. All units are equipped with Cummins diesels.



DIESELIZED BALLAST

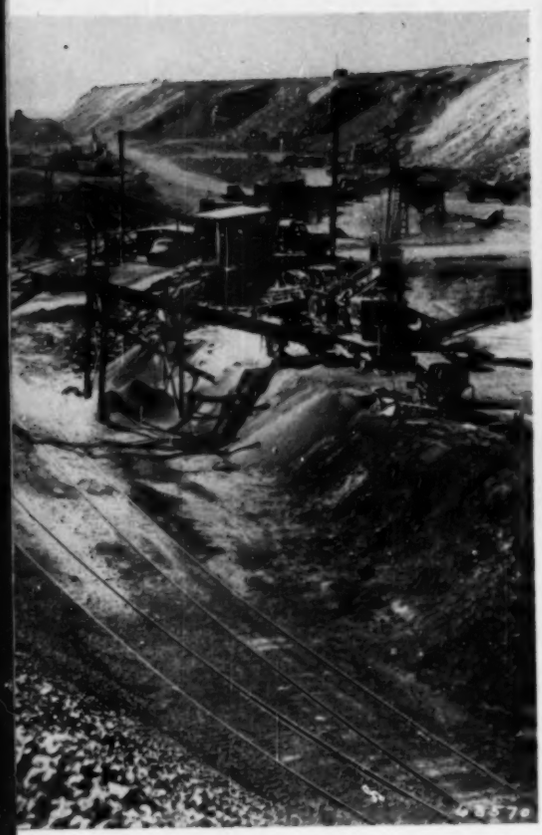
Diesels Push and Crush Steel Mill Slag for Use as Railroad Ballast.

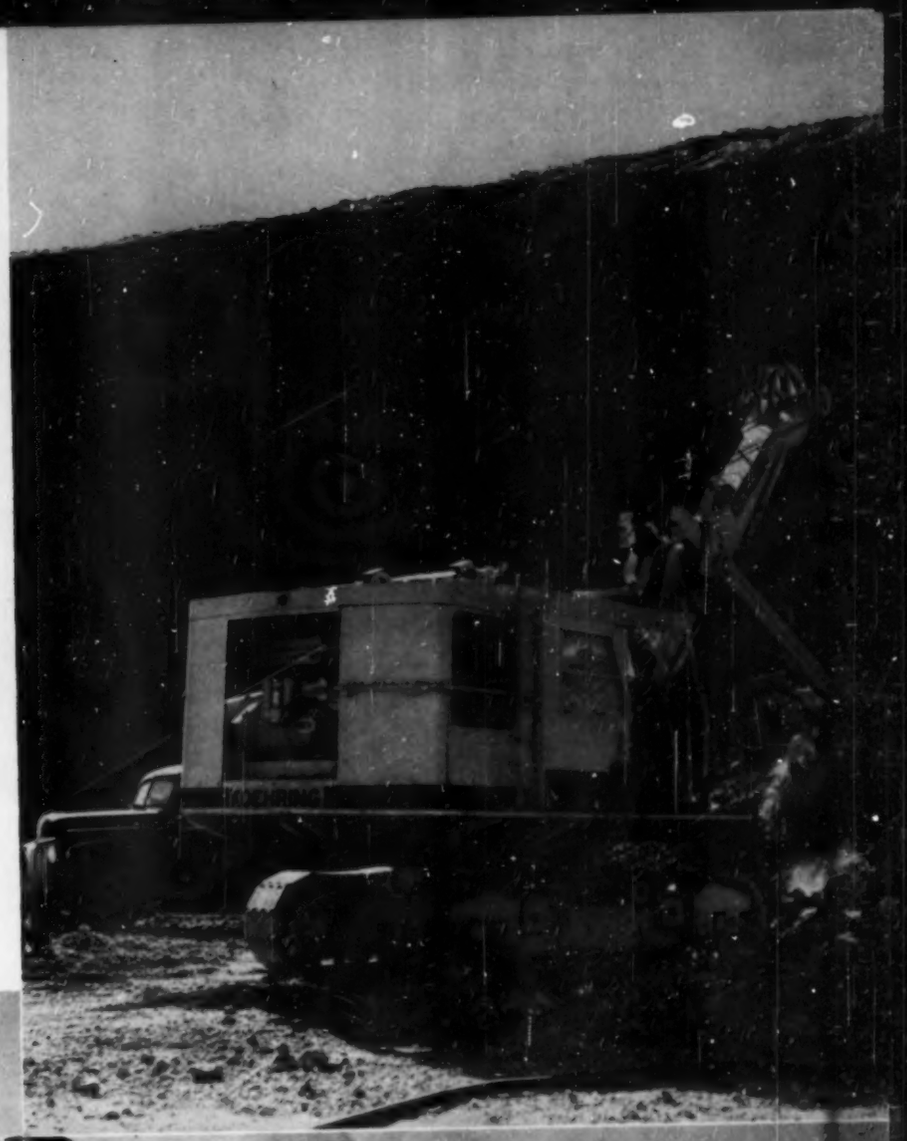
DIESELS save money and make money in many ways and in many places. We ran into one of the odd uses of diesel engines at Pueblo, Colorado, where steel mill slag is crushed and turned into excellent railroad ballast.

The contracting firm of Arthur and Allen, Pueblo, Colorado, has expanded considerably from the day in 1917 when they began operations with one piece of equipment, a ¾-yard, round wheel, Erie shovel. At that time they had a contract for loading metal slag for the Missouri Pacific Railroad.

Today they make excellent use of a ¾-yard gasoline crane used as a magnet, a ¾-yard gasoline dragline, one Model 401 Koehring gasoline dragline, two Model 605 Koehring diesel shovels, two Caterpillar diesel D8 track-type tractors with attached bulldozers, one Model 940-440 Austin-Western crusher, one Model 940 Austin-Western crusher, one Model 940 Austin-Western crusher and rolls, and one Austin-Western crusher powered by two Caterpillar D13000 diesel units with eight electric motors. This last crusher is capable of producing 2,000 cubic yards of railroad ballast per eight-hour day.

Arthur and Allen direct all their operations toward crushing blast furnace slag for the railroad. Two Model 605 Koehring shovels load the slag into trucks which haul it to the crusher, which in turn feeds directly into railroad cars. They fill approximately 80 cars a day with a 37-man payroll.





Two TD-24's, linked by cables for combined lugging effort when necessary in the sticky going, cradled the 30-inch tube for doping and wrapping. The rear crawler hauled the big dope wagon.

The doped and wrapped loose section is lowered into the ditch, as Emmett Wilkerson (on left bank) signals the tractor operators. In the immediate foreground is the original 24-in. line.

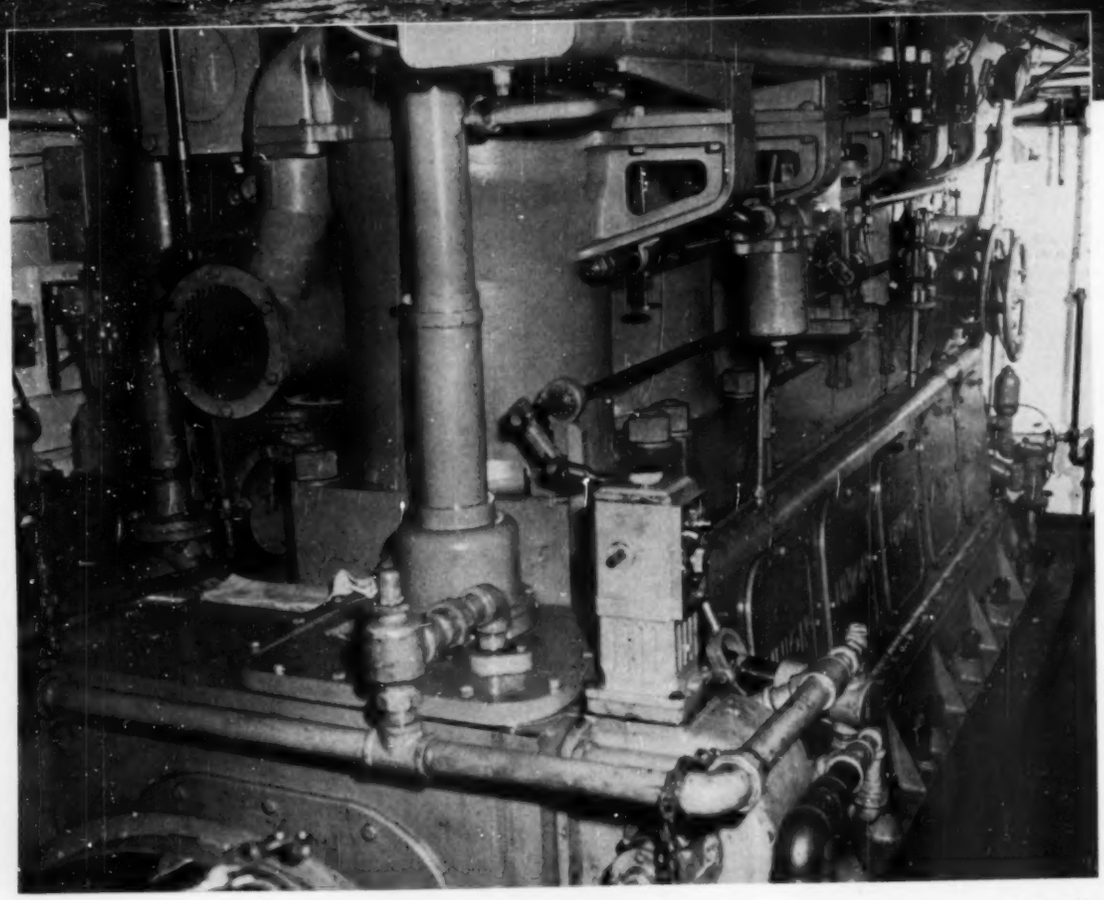
Cleaning and priming the 360-ft. crossing section, which was passed beneath tubes already in the line.

DIESELS LICK MUD IN PIPE LINE LAYING

MORRISON Construction Company, of Austin, Texas, gave a fleet of giant diesel crawler tractors a rigorous field test in the toughest kind of weather on a job for Tennessee Gas Transmission Company this winter. The contractor is doing 90 miles—White Bluff, Tenn., to Glasgow, Ky.—of a new 30-inch loop in TGT's 1,265-mile line from Corpus Christi, Texas, to Charlotte, W. Va. Six new International TD-24's, some equipped with the latest model matched Superior pipeboom, were used in one Morrison spread, heading northeast from White Bluff. This spread had to conquer mountainous terrain and deep, sticky mud resulting from three weeks of steady rain, yet put down 40 miles before suspending work in mid-January. Spread Superintendent Jack Hodges and his assistant, Emmett Wilkerson, termed the going some of the muddiest they had ever seen. An unusual aspect of the job was a crossing of the 30-inch loop beneath the existing line. This was necessitated by right-of-way arrangements. A 360-foot loose section of 30-inch was passed under both the original 24-inch tube and a newer 26-inch—which, too, had crossed the first pipe—and joined, by bell hole welding, to the continuous line on either side of the crossing.

Lining up the crossing section and the continuous line for bell hole welding.

An unusual crossing is practically completed here as the TD-24's hold the loose section off the ditch bottom while easing it past the 26-inch loop and up to the continuous line in the foreground.



TWO CANADIAN TUGS

By CHARLES F. A. MANN

WHILE a mythical International Boundary separates Puget Sound on the South and Alaska on the North, from what is actually one vast archipelago of islands, inlets and thousands of miles of magnificent waterway that gives access to the timber and fishing regions spaced far out from the larger cities, the economic characteristics of both sides of the boundary have created unusual differences in the whole field of inland waterways transportation. On the American side, for example, steam has disappeared from practically everything that moves, except ocean liners. On the Canadian side, nearly 90 per cent of all freight and passenger vessels and 50 per cent of the tugs are still steam powered. Powerful support is given steam due to the influence of British-built inland waterway tonnage, the reluctance of British-born or ancestored to give way to change, and the sharp differentials on bunker fuel oil and diesel fuel, all tend to supplement the whole Canadian policy from turning to diesel engines, but there are some exceptions to this policy.

One of the most progressive tug and barge companies is the British Columbia owned Straits Towing and Salvage Co., Ltd., headed by Stan S. McKeen and his son, Fred S. McKeen, as managing director. Out of their entire fleet only the old 119-footer, *Commodore Straits,* is still steam powered—a good tug yet for certain big jobs where economy is secondary. The Straits Towing fleet is managed directly by L. M. Grimstone and Bob Preston, Marine Superintendent, and comprises various groups merged into the parent company. Basically, their operation is geared to the vast, far flung lumber, logging, pulp and paper, hogged fuel and supply, lines connected with British Columbia timberland operators. As the nearby timber is cut and more Government and Dominion lands are open to loggers the longer become the hauls of rafts and general heavy cargo by barges to keep the enterprises working. Hauling large rafts from the Northern British Columbia camps to mills on Southern Vancouver Island and in the Fraser River—British Columbia Harbor area—utilizes the entire diesel fleet effectively. The best way to get a picture of the Straits fleet is simply to list them, together with their length and power:

Barrow Straits—55 feet—165-hp. Union.
Bering Straits—55 feet—615-hp. Cooper-Bessemer.
Broughton Straits—65 feet—375-hp. Washington.
Burnaby Straits—70 feet—400-hp. Union.
Canso Straits—68 feet—240-hp. Polar Atlas.
Commodore Straits—119 feet—600-hp. Steam.
Georgia Straits—84.5 feet—425-hp Union.
Hecate Straits—89 feet—500-hp. Enterprise.
Malaspina Straits—73 feet—275-hp. Union.
Montague Straits—64 feet—230-hp. Union.
Rosario Straits—90 feet—450-hp. Fairbanks-Morse.
Victoria Straits—56 feet—230-hp. Union.
Straits—40-foot Harbor Tug—135-hp. Cummins.

The company operates 58 barges from 32x80 feet up to 36x130 feet, including eight built of welded steel and a covered cement barge. (An affiliated company, Pacific Salvage Co., Ltd., will be covered in a forthcoming story.)

The two newest units in the fleet are the *Burnaby Straits,* repowered last month at the company's own docks, and the *Bering Straits,* finished last fall. Formerly the tug, *Union Jack,* before she was acquired by Straits Towing, the *Burnaby Straits* was repowered in March with a big new-type Union diesel, supplied by their Vancouver and British Columbia distributors, the famed Burrard Iron Works, Ltd. The vessel is a 101-ton rated tug, equipped for long tows from Northern British Columbia of from three to six weeks' duration. She is a husky wood hull having principal dimensions of 70.6 feet by 18.6 feet by 10.3 feet depth. All crew members have a private stateroom in roomy quarters and a roomy galley equipped with a Frigidaire. The main diesel develops 400 hp. at 390 rpm., giving plenty of power and a long cruising radius. The hydraulic towing winch carries 1,400 feet of 1¼-inch towing line. A hydraulic anchor winch and hydraulic steering are fitted.

Re-engine work was all done under the supervision of Mr. Bob Preston, Marine Superintendent for the company, at their own shops. The tug will handle rafts of 42-45 sections in fast time from the Northern Coast logging camps.

The *Bering Straits* was completed last Fall for the same general log-tow operation. It is 55 feet by 16 feet by 9 feet depth and carries a 400-hp. Cooper-Bessemer diesel and a Buda diesel auxiliary for driving the air compressor, fire and bilge pump and generator. A 65-watt radio and oil burning heating boiler is fitted. Crew's quarters for six are provided, as well as electric refrigerator and oil burning galley range. A hydraulic towing winch with 1,200-foot cable capacity is fitted, and fuel capacity is 2,100 gallons. Hand steering is used. The ship is of welded steel construction.

Canadian diesel tug *Burnaby Straits*, powered with 400-hp. Union diesel rated at 390 rpm. A 101-ton heavy duty diesel ship equipped for long tows.

The *Bering Straits* is a 55x16x9-foot diesel tug powered with a 400-hp. Cooper-Bessemer diesel with a Buda diesel auxiliary driving the air compressor, fire, bilge pumps and generator.

Supervising & Operating Engineers Section

CONDUCTED BY R. L. GREGORY

Diesel Crankcase Explosions

FOREWORD: The following article appeared in the first quarterly issued of the 1950 *The Locomotive*, house organ of the Hartford Steam Boiler Inspection and Insurance Co. We are indebted to *The Locomotive* and to Mr. H. J. Vander Eb, Assistant Chief Engineer for the Harford Company, for the privilege of using it, but since it sheds some new thoughts on a subject in which we are all interested, we feel that we should pass it on to our readers, many of whom might not have otherwise had a chance to read it.

Crankcase explosions on diesel engines fortunately are rather infrequent occurrences. Usually when such an explosion occurs, the damage to the engine itself is confined to the parts which, in a red hot condition, ignited the lubricating oil vapor in the crankcase. The property damage outside the engine generally consists of broken windows and distortion of window frames in the power plant. However, in some cases, crankcase explosions have resulted in extensive damage to surrounding property and injuries to persons. This is likely to be the case when partly burned oil vapors blown out by the first explosion cause a secondary fire or explosion outside the engine. That is, the first explosion in the crankcase produces a mere puff, just sufficient to blow off the crankcase doors, and subsequently there is a secondary explosion after the oil vapors become mixed with the air outside the engine to form a lean mixture which possesses a heavy detonating quality.

In a diesel engine the lubricating oil vapor mixed with the air in the crankcase is necessarily a rich oil-air mixture and may be somewhat contaminated by the gaseous products of combustion which blow past leaky piston rings; therefore, the crankcase vapors are naturally a slow burning mixture rather than a dangerous explosive mixture. This has been borne out in many cases where the ignition of the vapor by overheated parts resulted only in black smoke issuing from the breather pipe. However, when the breather or vent of the crankcase is connected to the suction side of a scavenging pump or blower, and there is much air leakage into the crankcase due to poorly fitted crankcase doors or through other openings, the oil-air mixture in the crankcase may be quite explosive when ignited. The igniter of the vapor is usually a piston skirt which develops a red hot spot when the piston scuffs or seizes in the cylinder liner, but it may be a seriously overheated bearing or bushing.

Some years ago, when crankcase explosions began to occur more frequently, the question was raised as to whether the latest oil refining methods could possibly have left greater quantities of the more unstable compounds in the lubricating oil. The possibility has ben investigated, but there is as yet insufficient data on such explosions to answer the questions. Apparently crankcase explosions can occur on all types of diesel engines, two-cycle or four-cycle, with or without scavenging blowers, air or mechanical injection and low or high speed. The examples of a few typical crankcase explosions hereafter described should be of interest. A 3,000-hp. diesel engine, 9-cylinder, 27½-inch stroke, 2-cycle, 240-rpm., closed cooling system, suffered a crankcase explosion when the lubricating oil vapor in the crankcase became ignited by a hot spot at the bottom of the skirt of piston No. 7. The crankcase doors, of light sheet metal construction, were blown off. Several windows and doors of the plant were blown out or distorted. A part of the roof of lighter construction than the rest of the roofing was badly shattered. The serious ensuing fire in and around the engine was extinguished by the local fire department. One operator was seriously burned. The engine had been started in the morning and in about eight hours the load on the generator had gradually built up to about 70 per cent of rated capacity. The temperature readings of bearing oil and cooling water were normal and the temperature differential between the water entering and leaving the cylinder jackets was only about 10°F., showing that the cooling water circulation was ample. The water used at this plant was not scale forming. Following the accident, examination of the affected piston disclosed that the piston rings were free in their grooves and the fuel jet, when tested, was found to function perfectly. One piston and one cylinder were badly scored and cracked beyond repair. The crankcase doors were buckled and bent. The total cost of all damage was in excess of $4,500.

A little more than one and a half years later the same engine suffered another crankcase explosion when piston No. 7 again became overheated. The first symptom of this trouble was smoke issuing from the shaft seal next to the flywheel. The engineer immediately proceeded to shut the engine down. The generator had by this time been disconnected from the bus, and as soon as the fuel valve had been closed, the engine rolled to a quick stop. Just about the time the engine came to rest, five crankcase doors were blown off with considerable violence. A large ball of fire filled the space adjacent to the crankcase and the room filled with smoke, making further observation impossible. There was no secondary explosion, but the force of the explosion in the crankcase blew off a large door of the plant. When the engine was dismantled, it was found that serious overheating and scoring had occurred at the top of the piston skirt, and the affected piston and cylinder liner were damaged beyond repair. There were no personal injuries owing to the fact that the operators by this time had learned to keep away from the crankcase doors under such conditions. The total of all damage was $2,000. Prior to this latest accident on this engine there were two other occasions when pistons overheated; one involved piston No. 2 and the other involved piston No. 5. The lubricating oil vapor did not become ignited in these instances.

A 700-hp. engine, 6-cylinder, 20-inch stroke, 4-cycle, 327-rpm., closed cooling system, suffered a crankcase explosion when the lubricating oil vapor in the crankcase became ignited by a badly overheated bearing and a seizing piston. Irregularity in the speed of the engine was the first symptom of trouble, and attempts to regulate the speed were fruitless. The engine rapidly lost speed and just before it came to rest the initial explosion occurred and was followed by a series of minor explosions which bulged and warped the fabricated steel crankcase doors without blowing them completely off. One large window of the plant was blown out by the first concussion. When the crankcase doors were removed, water was observed leaking from the bottom packing glands of the cylinder liners. The babbitt of one crank bearing had burned out and all other bearings were partly melted. The shaft journals were found to be scored and the shaft was slightly sprung. Apparently the lubricating oil had been contaminated with water for a considerable period of time, which led to the overheating of the bearings and the seizing of the piston. While the total cost to repair the engine was $12,000, a large share of this amount represented damage that had occurred long before the crankcase explosion. All the bearings had to be renewed and the shaft reground to make it straight.

A 715-hp. engine, 5-cylinder, 25-inch stroke, 4-cycle, 327-rpm., open cooling system, experienced a crankcase explosion when the lubricating oil vapor was ignited by a badly overheated and seizing piston.

The engine was operating normally under a load of about 75 per cent of rated capacity when the operator heard an unusual noise. He had climbed up on the engine to lubricate the valve gear when a crankcase explosion occurred which warped the crankcase doors and poured flames of burning oil vapor into the engine room. The operator was severly burned by the blast. A steel sash window, 12x15 feet, was blown loose from the building wall and a large number of panes of other windows of the building were blown out. The scoring and seizing of the affected piston was confined to an area all around the piston for a vertical distance of about 7 inches up from the bottom edge of the skirt. The liner of the cylinder in which the piston seized was found to be coated with scale 1/32-inch thick, and a bushel basket of scale was scraped off the liners of the other four cylinders. The open type cooling system for this engine was of scant capacity so that excessive make-up water was used to hold the temperature of the water down. The make-up water was added manually. The cause of the piston seizure was undoubtedly the sudden inflow of cold make-up water, which resulted in shrinkage of the cylinder liner. The damage resulting from this crankcase explosion totaled $3,400.

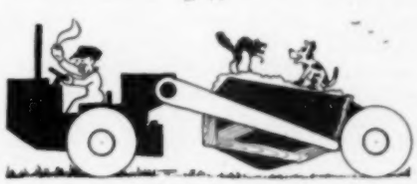
The most serious crankcase explosion on record involved a 3,000-hp., 2-cycle diesel engine which had nine cylinders, 20½ inches in diameter and a 27½-inch stroke. The engine operated at 240 rpm. The igniting agent in this case was a red hot bushing on one of the gears driving the scavenging blower. The first symptom of trouble was a puff of partly burned oil vapor from the gear casing when the lubricating oil vapors became ignited by the red hot gear bushing. The operators immediately shut off the fuel supply to the engine and at the same time attempted to open the circuit breaker which connected the generator of the engine to the station bus. However, the engine continued to revolve, and later it was found that the circuit breaker had not opened when the remote control lever at the switchboard was operated. While the engine was still running (motorized) there was a second explosion that blew off all the crankcase doors. At that time a large amount of the partly burned oil vapor was blown out of the crankcase. The partially burned lubricating oil vapor rose to the ceiling of the plant. Apparently in so doing, it became well mixed with air and a heavy detonation occurred right under the roof of the plant. The roof as a whole was lifted a short distance in the air, and then crashed down on the side walls of the plant. Two of the operators were killed by the falling roof.

The principal cause of ignition of the lubricating oil vapors in an engine crankcase is scuffing of a piston resulting in the rapid development of a red hot spot near its lower end. To a lesser extent hot crank bearings and piston pin bushings are responsible for such ignitions. Therefore, the best chance of preventing crankcase explosions lies primarily in the prevention of scuffing or seizing of pistons, and of overheating of bearings. In many cases, piston seizures are the result of delayed maintenance of the piston rings, so that excessive blow-by of hot gases occurs and, consequently, lubrication of the piston fails. On the other hand, rapid gumming-up and stocking of piston rings, with resulting blow-by, may be caused by an excesive amount of oil on the cylinder liners as a result of oil-slinging by the crank, where the scrapper rings cannot fully take care of this condition. As an example of this phenomenon, the seizing of pistons occurred repeatedly in a dual-fuel engine as a result of faulty design of the drain pipes of the oil cooled pistons. These drain pipes permitted an excessive amount of the oil to splash on the cranks. After the oil drain pipes were corrected no further piston seizures were experienced. In some installations, the underlying cause of piston seizure has been traced to an improperly located pipe connection for the admission of the make-up water to a closed type cooling system, so that the make-up water entered the water-inlet pipe to the cylinder jackets. With such an arrangement, the careless admission of a considerable quantity of cold make-up water to the cylinder jackets may cause piston seizure. In one such installation, after repeated piston seizures, a crankcase explosion finally occurred. The make-up water connection was then relocated so that the make-up water entered the water discharge pipe from the engine, and no further trouble was experienced.

Piston seizures and crankcase explosions can be prevented by a regular schedule of maintenance. The following recommended routine for maintenance of oil and gas engines, under average conditions of operation, has been found beneficial in the prevention of breakdown:

Parts to be checked	*Operating Hours*
(1) Apply fuel injection nozzle tester	600-1,200 hours
(2) Piston and piston rings in 2-cycle crankcase scavenging engines	3,000-4,000 hours
(3) Exhaust port bridges in 2-cycle engines	3,000-4,000 hours
(4) Pistons and piston rings in 2-cycle engines with scavenging pumps, also 4-cycle engines	5,000-6,000 hours
(5) Exhaust valves in 4-cycle engines	1,200-2,500 hours
(6) Fuel pumps and fuel pipe systems	4,000-5,000 hours
(7) Lube oil pumps and oil pipe systems	4,000-5,000 hours
(8) Clean air filters and lube oil filters	300- 500 hours
(9) Inspect and adjust crank and main bearings	5,000-8,000 hours

The listed time intervals between servicing of the several items are subject to some modification in accordance with the actual experience of each individual plant.



High-Speed Diesels . . . Design, Operation & Maintenance

CONDUCTED BY H. G. SMITH

Lubricating Oil

Selection – Oil Terms – Additives

THE selection of the proper lubricating oil for your various pieces of equipment is not too difficult, but it does happen that some contractors insist upon getting themselves into trouble, usually because they listen to too many opinions. If you collected a sample of each grade of oil made by the multitude of so-called oil producers you would probably wind up with several thousand cans and jars of them. We all can see the great difference by comparison between the oil we get in the can marked fine machine oil and the black oil you have often seen the man putting in the railcar journals at the depot. We cannot, however, tell the difference betwen several lubricating oils submitted for use in engines by just looking at them or feeling them between our thumb and finger. You do hear the remark that it must be a good oil because it looks so clear and some people will buy it because of this clear appearance. If it was that simple there would be no necessity for any further discussion, but it is not. Appearance has little to do with the structure and make-up of the oil . The heavier the grade, that is, the more viscous the oil, the darker it will be when compared with the same make of oil in the lighter or thinner grade. Speaking of viscosity of an oil may be a bit confusing to some of you, so later on in this article an explanation of it and some other oil terms will be given in a simple manner. These explanations will tell you what they are but in no way be helpful in the selection of an oil.

The main subject is, "How do I go about buying the proper oil for my operation?" In the first place such a decision can only be made by and between you, your oil company, and the engine manufacturer, and secondly, this decision can be made only after a thorough study is made of your operating conditions. Is your operation—light or heavy loads, intermittent or continuous, widely variable in temperatures and altitudes, humid or dry, dirty or clean, and furthermore and quite important, is the equipment constant or variable speed? All of these questions must be answered and recognized. In the past years the oil companies did not realize the importance of these points and they were not careful to duplicate these conditions when testing the quality of their oils. Experience taught them that it was not enough to set up an engine in the laboratory and run a load and speed test. Supplementing these tests with all kinds of operating conditions, actually on the job, has resulted in some very fine improvements. To bring home to you the seriousness of these variables, you can take your own operation as an example. Much less trouble is experienced with the engines that operate your air compressor, your generator set, or your welders. There are many cases where an engine that is used to drive an air compressor gives satisfactory performance, but, when it is operating in a truck or hauler where the speed and load is continually variable, it seems to have more ring sticking, valve sticking and bearing trouble. This is all due to the oil being subjected to conditions that have a tendency to break it down and contaminate it.

The more progressive oil companies know these problems and when they recommend one type and grade of oil for one operation and another for a different operation, even though the same engine is used, they are giving you the benefit of their company's vast experience. The larger and more prominent oil producers are by far the best to deal with, however, the size of a company is not necessarily the answer. There are many very good small companies that have produced, and are producing, excellent oils. Be sure that when dealing with these smaller companies you pick a producer who has control over his product and not one that is just buying some kind of an oil and giving it some fancy trade name. You cannot possibly decide on your selection on the basis of the price and the looks. It must be done carefully and scientifically. Since competition is keen in the oil industry, you can trust the more reputable companies to continue working on your problem to get the correct grades for satisfactory operation, more than you can some salesman who has an appealing price. Good companies do not have to sell inferior cheap oils. They know that good satisfaction will bring repeat orders. One operator I contacted was even fooled by a company who placed on their containers a statement that it was made especially for the particular engine that he was using. He admitted that he bought it because it did have this information on the containers. After several expensive high speed diesel engines kicked out their bearings, he consulted the engine manufacturer, and to his sorrow, they found that the oil was entirely unsatisfactory. Such an experience was extremely expensive and later led to a very serious lawsuit.

One method of solving the proper grade and make of oil to use is practiced by some contractors. When new equipment is received, they contact another operator who has had the same equipment in a similar operation. However, very often, great pressure is exerted on the contractor by some local oil company to use their oils for local prestige. If an operator is faced with such a situation, he must depend on the equipment and engine manufacturer for guidance. It is possible that they may know through tests and experience that the local oil is satisfactory and, if they don't have such experience, it is best to use the known oil until the local oil is tested and approved by the engine company.

Here are some of the things that are sometimes discussed when oil is the subject: viscosity, flash, carbon residue, acidity, color, lubricity or oiliness, additives, oxidation, corrosion resistance, whether paraffin, naphthenic or asphaltum base. None of these can be determined by any simple tests. To find out all about each point, it requires very special instruments and equipment. Each item has its importance. Each oil company has its own formula and uses blends in proportion to what they know will give certain results. It is a highly scientific study, so much so, that a very prominent oil engineer once told me that they have reached the point where they break the crude oil down into its basic atoms and start building up to where they can make from a gas to a solid out of the same basic crude. Heat, cold, water and acids are the things that disturb an oil. An engine has all of these things in its make-up so that careful selection of the oil to use is highly important. Viscosity is the most important physical property in a diesel lubricating oil because basically it governs the manufacture, specifications, application, film thickness, friction developed in the engine, design, wear and oil consumption. Viscosity may be defined as a measure of an oil's resistance to flow. The higher the viscosity, the more slowly it will flow, and the lower its viscosity, the more freely it will flow. The S.A.E. (Society of Automotive Engineers) established several years ago a series of numbers to designate the viscosity of an oil. S.A.E. No. 10 is thin and No. 20 is slightly more viscous and so on up the scale to No. 60. The higher the number, the thicker it is, and these heavier oils, being a little more resistant to flow, have a tendency to cause greater friction between moving surfaces and, because of this, most engine manufacturers are designing their engines to use the thinner oils. This is possible today because the oil companies have been able to improve or refine the basic crudes

so that they have greater film strength and oiliness to withstand the higher loads and temperatures and still make the oil less viscous. Heavier or more viscous oil is only recommended today where additional service is desired from the engine before it is dismantled for replacement of worn parts. To decide that an oil is good because it is made from some particular base crude such as paraffin, etc., is wrong because each base crude has been found to have some particular inherent quality that has its advantages and good points.

There are four major producing oil fields in this country which are, Pennsylvania, Mid-Continent, California and Gulf Coast. Solvent processing of the base crudes has enabled the refiner to obtain entirely different results in the final oil that were not possible in the old original refining methods. For this reason today it is entirely impossible to decide that an oil is good because it is made from a particular crude. In the past, and to a certain extent today, many operators of diesel engine equipment still use physical property specifications as a criterion by which they purchase lubricating oil for their equipment, although the specifications did not insure satisfactory performance of the oil in the engine. As previously stated, the only way in which performance factors can be established is through actual engine performance tests. Additives to basic oils have entirely changed the picture so far as what an oil can do today. They do not make a bad basic oil good but they do make a good oil better. They have one bad habit which has been a subject of a lot of discussion, and that is the habit of turning the oil black. Additives do this because that is the purpose of using them. In service, all diesel oils soon become contaminated with matter such as road dust, iron oxide, metal cuttings, soot, metal salts, acids and partially burned fuel. The oil also has a tendency to deteriorate under the influence of high temperatures and air. All of these contaminates are attracted to the metal parts of an engine just like iron filings to a magnet. They will ultimately cause sticky valves and piston rings and many other things. Additives in various forms added to the oil cause these contaminates to be dispersed and held in suspension in the oil. They break them down into a state where they are not harmful. They remain in suspension in the oil in colloidal form and are circulated in the oil stream, which generally results in the oil maintaining an apparently black and dirty appearance. There is no need for alarm when this is observed, since the oil is doing what it was made to do, keep the engine clean as well as insure satisfactory lubrication performance. Additives are also used to decrease the rate of oil deterioration and prevent varnish and corrosion of alloy bearings.

These points are interesting only as a matter of general knowledge. They do not help you in selecting your oil. My recommendation to you is to deal with a known reputable oil supplier and if you find an oil that is satisfactory for any length of time, don't change to another grade or make until you have definite proof that it will be as good or better than what you have been using. In case you are buying some new equipment, consult the equipment and engine manufacturers recommendations and stick to them.

WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **HAMISH FERGUSON**

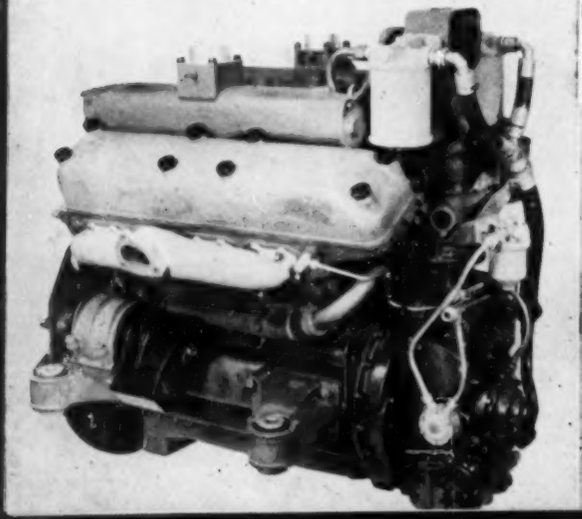
Hamish Ferguson was appointed Secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical assistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr. Ferguson continues to do independent consulting work.

THE Rover Company, Ltd., designers and builders of the world's first gas turbine car recently exhibited at the British Motor Show in New York, have also developed a new V-type diesel in conjunction with the Ministry of Supply Agency Factory, who were responsible for the development of high performance engines for special purposes during World War II. The engine has eight cylinders in two banks, mutually inclined at 60 degrees, the bore and stroke are 5.4 inches by 6 inches, giving a cubic capacity of 18 litres, the compression ratio is 16.5 to 1. The Meteorite Mark 100 develops 320 bhp. at 2,400 rpm. and weighs only 1,500 lbs. dry, but complete with essential built-on accessories and ready for installation. The design is such that the engine can be readily adapted to suit various installation requirements. It has already been used in heavy trucks and is expected to be particularly suited to high speed power boats, locomotives and rail cars, power packs for use as emergency generating plants, and oil well drilling rigs. In all these applications its light weight and the exceptionally small space that it requires are of advantage. The main structure of the engine is made in castings of aluminum alloy to Specification D.T.D. 133—the same material as was used for the Rolls-Royce Merlin, aircraft engine. Overhead camshafts are used, these being driven from the front and through bevel gears. Three valves per cylinder are employed, two inlets and one exhaust of larger diameter. The exhaust valves are sodium cooled to ensure minimum maintenance. They are Stellite tipped and Brightray seated. Silchrome is used for the inlet valve seats. Pistons are die-cast in an aluminum silicon alloy and they are anodized to provide a surface finish resistant to corrosion and having useful oil retaining properties. Floating gudgeon pins are employed and the small-end bearing incorporates a floating bush. Both big-end and main bearings are of lead bronze carried in thin steel shells; they are plated with a tin-lead blush to provide against overheating during the running-in period. The cylinder liners are of forged chrome manganese steel and the top ends are chromium plated to resist wear in the area most affected by the piston rings. The new engine has attracted much attention in Europe and has already been incorporated in some special pipe-carrying vehicles built by Thornycrofts for use under severe desert conditions in Iraq.

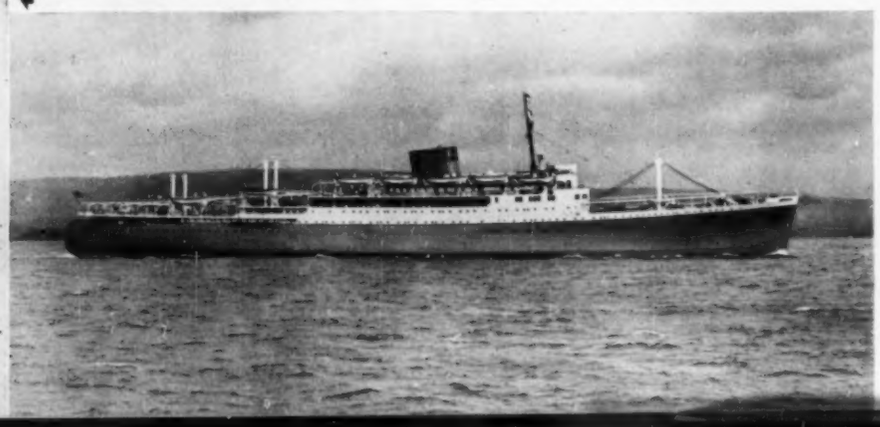
Harland and Wolff have successfully launched the *Juan Peron*, which, when completed, will be the world's largest whale factory ship. She is designed for carrying some 27,000 tons of whale oil and associated products. She will be about 665 feet in length overall, and a distinctive feature of her design is the elaborate machinery to be installed for the processing of the whale residue after extraction of the oil, insuring that no part of the carcass is wasted. A separate 'tween decks has been provided with conveyor gear for handling and discharge. The new vessel will also be able to operate as an ordinary tanker during the whaling closed season. The vessel will be propelled by twin screw Harland B & W 6-cylinder diesels, an engine type which has proved to be highly satisfactory for the exacting conditions of the whaling service.

Bloemfontein Castle. This new passenger liner, also built by Harland and Wolff, has successfully completed her sea trials and is in service on the Union-Castle Line. In addition to providing accommodation for 739 passengers, she also has considerable space for general and refrigerated cargo. Her gross tonnage is 18,400. The propelling machinery consists of twin diesels of the Harland B & W double-acting type, each having eight cylinders, 620 mm. bore by 1,400 mm. stroke. The auxiliary generating machinery comprises four sets each capable of an output of 450 kw., 225 volts d.c. The engines, built by H. & W., are of the 2-cycle, single-acting, opposed piston eccentric type.

The writer recently attended a demonstration of Ruston & Hornsby's shunting locomotive incorporating mechanical drive through a constant mesh gear-box. The main cylinder is the well-proved Mark 6-VPHL having six cylinders and developing its rated full power of 165 bhp. for one hour, at 1,250 rpm. The gear box is of the oil-operated type arranged with four gears for forward and four gears for reverse direction. The forward and reverse gears are of the bevel type with dog clutches operated through a control valve in the cab. All controls are situated in accessible positions and are duplicated at either side of the cab. Operation is simple and the driver, who has spent 37 years in steamers, carries out normal shunting duties quite successfully after only one day's instruction.



The Rover Meteorite diesel engine.



Diesel vessel *Bloemfontein Castle*.

FAIRBANKS MORSE UNVEILS NEW LOCOMOTIVE

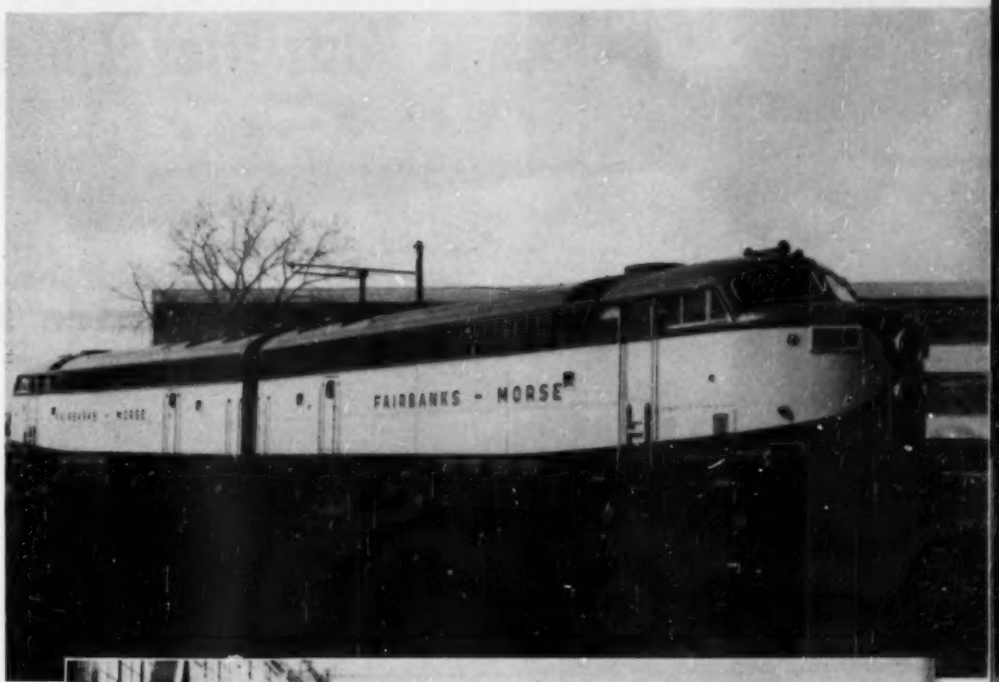
By **WILBUR W. YOUNG**

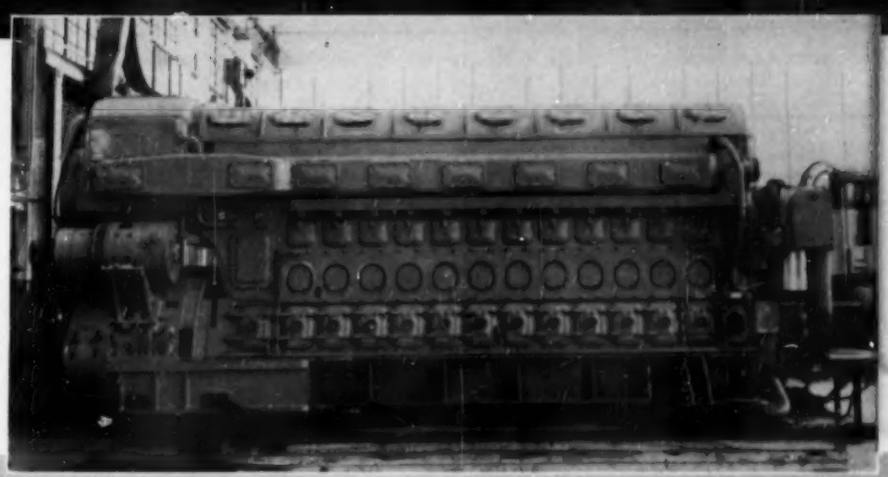
CHICAGO, APRIL 25.—It was in the November, 1948, issue of DIESEL PROGRESS that we told our readers about the "Consolidation Line" of diesel-electric road locomotives which Fairbanks-Morse announced at a press party of September 25th of that year. Today we saw and rode a two-unit, 4,800-hp. passenger version in the flesh, so to speak—rode in it and behind it on a fast run from Chicago to Sturtevant, Wisconsin. The keynote of this occasion was sounded by Robert H. Morse, Jr., president of Fairbanks-Morse, when he said: "This diesel-electric passenger locomotive of 4,800-hp. that you have inspected today represents the greatest advance in motive power engineering and design in recent years. You will read or be told of its many advantages to the railroads. The 'Consolidation' line of road passenger and freight diesels of which this 4,800-hp. two-unit passenger locomotive is a prototype represents the Fairbanks, Morse & Co. bid for an expanding position as a major supplier of locomotives to the American railroads."

This new two-unit passenger locomotive is the leader of a complete line of diesel-electric road locomotives manufactured at the Beloit, Wis., works of this company. This complete line of locomotives entails not only refinements to previous design but it is claimed represents a real advance in diesel-electric locomotive design. As an example, power plant ratings of 1,600-hp., 2,000-hp. or 2,400-hp. can be installed in one basic structure with no change in general arrangement of the basic unit; hence, the name "Consolidation Line" or "C-Line." The three horsepower ratings can be coupled in various combinations from 1,600-hp. to at least 9,600-hp. in a single locomotive. This versatile design has not been attained at the sacrifice of other desirable qualities. The entire design is aimed towards interchangeability of all major assemblies between basic units of any horsepower rating, as well as interchangeability of small replacement parts within those major assemblies.

Each 2,400-hp. unit is powered by an F-M 12-cylinder opposed-piston engine rated 2,400-hp. for traction at 850 rpm. This is believed to be the most powerful single diesel engine that has yet been installed in locomotives in this country. On the basis of brake horsepower for traction per cylinder, this engine rating is equivalent to the established ratings of other O-P engines used throughout the entire line of F-M diesel-electric locomotives. The 8 and 10-cylinder engines are used in a number of road-switcher models as well as in the C-Line. The 6-cylinder engine is used in heavy switching locomotives.

The principal items of equipment connected with the diesel engine installation in these locomotives consist of Farr air filters; Michiana lubricating oil filters; Air Maze lube oil strainer elements; Wm. W. Nugent fuel oil filters; Yates-American radiators; Ross oil heat exchangers; Burgess Manning engine snubbers and silencers.





Exchange Your Diesel Maintenance Ideas

CONDUCTED BY R. L. GREGORY

Another Maintenance Problem

ONE of our readers recently wrote this department and presented the following questions on maintenance to us for our suggestions: "A few months back we installed a mechanical injection unit in our plant. This unit is equipped with Bosch fuel pumps, nozzles and injection equipment, with which our plant personnel is not too familiar, since our other units are of the air injection type, using a different type of injection equipment. After operating this new unit for several weeks, we began to have trouble with the nozzles and injection units, and I am wondering just where the fault lies, as to whether it is due to our methods of maintenance and operation. I have discussed this problem with service engineers and others of my acquaintance, and have received so many varied opinions, none of which coincide, one with another, that it leaves me in a quandary, since none of the suggestions tried has improved the situation. Hence this letter to your department in the hope that you may make some suggestion we have overlooked, which will be helpful to us."

The writer can readily realize that this particular reader might become confused on this matter, especially if he were not familiar with solid injection atomization and the conditions under which it functions best. This is true especially where he has had a variance of advice and ideas as to just what to do and how to maintain such equipment. All of the opinions that he has received have undoubtedly been given to him in good faith, but undoubtedly are the results of each informant's own actual experiences. Hence the variance. One thing that he must realize is that no two units will function alike and react to the same maintenance procedure, especially in plants of varying conditions and characteristics. We all realize that there may be any one of a dozen reasons, or a combination of reasons for this reader's difficulties. It may be a fuel problem, a cooling problem, a problem of care and maintenance or inspection, but whatever it is, there is no doubt that it can be corrected if properly attacked. In the first place the Bosch Company have some very complete instructions on the maintenance, care and operation of their equipment, which if religiously followed will eliminate any trouble from that source. However, conditions beyond their control might be effecting atomization. My first suggestion would be that a representative of the vendor of the injection equipment be contacted to look into the difficulty. Of course that doesn't always solve a problem. It has been the writer's firm belief and conviction that it is good insurance to have a service engineer from the manufacturer on hand when troubles of any import occur on any major equipment. Not only because they are more familiar with their company's equipment but also because often outage time can be lowered by eliminating lost motion in effort. However, there is always one thing that seems to stick in the crops of plant operating and maintenance personnel, and that is to have representatives of the same vending company give such a wide difference of opinion on matters of adjustments, tolerances, settings and operating methods, to say nothing of maintenance routine and methods. This is an unfortunate condition for the plant personnel and often leaves doubt in the minds of plant personnel. When observed from one viewpoint it can readily be realized that again these men are giving you ideas from their own individual experiences, although they should be guided to some extent in giving these opinions, by the basic principles, and recommend practices of the service departments of the vending company and not go out on a limb by superseding these principles with ideas contrary to general practice.

On the other hand, perhaps it is a good idea to have a variance of opinions. That makes for progress and at the same time, once the operating and maintenance personnel realize that they are getting a variance of opinion they may be more prone to become more self reliant in working out their own problems. We could cite several case histories covering this point. The dominant factor, that we must all keep in mind, is that no two units will function the same, respond to the same course of maintenance and operate identically. It becomes a problem of cut and try and then settle upon the course which brings forth the best results. Oftentimes this can best be accomplished by the process of elimination. For example, take this reader's problem. His first effort should be toward ascertaining whether or not his injection is in perfect mechanical order, his nozzles working under proper tension, clean and properly adjusted. If he finds such to be the case, then ascertain whether or not his pumps are delivering fuel properly, whether scavenging is being properly done. Next he should check his fuel and find out whether he has the proper fuel for the type of injection equipment. Timing plays an important part in this situation. The timing should be checked to make sure that it is neither too early or too late. Again he should ascertain whether he has the proper conditions of cooling, since instances of improper cooling have often been known to be the cause of many troubles.

Along with all other questions concerning diesel operation, there naturally is a wide variance in opinion as to the proper periods of inspection and maintenance. For instance, in the article published in the Supervisors' section of this issue, the writer, Mr. Vander Eb, suggests that the fuel nozzle tester be applied at from 600 to 1,200 hours. He tempers that by saying that the period of inspection depends upon plant characteristics and operation. Personally, the writer prefers to shorten that period when possible and we apply the tester from 400 to 600 hours of operation, simply because our conditions are such that we can do so, and again because we find quite a variance in fuel conditions and other conditions which effect atomization. The same is true on the inspection and maintenance of other integral parts. In the long run it simmers down to plant conditions, load demand, type of fuel and all the other matters which effect plant operation. It is simply cut and try. We do believe that when conditions permit, that inspection, cleaning and checking cannot be overdone, because there is always the possibility that some characteristic has changed which might effect efficient operation, and it is better to catch that condition in time, than let it catch you. The next issue will be devoted to other questions, recently received from our many readers.

Elected to Board of Directors

Alexander H. d'Arcambal Edwin J. Schwanhausser

Frederick U. Conard, President and General Manager, announced that at the annual meeting held April 5, 1950, two new directors were elected to the board of directors of the Niles-Bement-Pond Company, West Hartford, Conn. The two new directors are men who are widely known in their respective fields of endeavor and enjoy outstanding business reputations.

Edwin J. Schwanhausser (right), Executive Vice President of the Worthington Pump and Machinery Corp., of Harrison New Jersey, began his business career with that corporation and progressed successively through factory, machine shop, field service, and other phases of the corporation's operation until he became assistant works manager in 1915, serving in that capacity until 1929. He was works manager of the Buffalo Works from 1929 until 1938, and was elected vice president in charge of the Buffalo Works in 1939. In 1945 he was elected vice president in charge of sales, and on July 1, 1949, he became executive vice president of the corporation. He was elected to the board of directors of Worthington Pump and Machinery Corporation in 1942.

Alexander H. d'Arcambal (left), Vice President, General Sales Manager and Consulting Metallurgist of N-B-P Company, joined Pratt & Whitney as Chief Metallurgist in 1919 and has directed the program of metallurgical development as applied to machine tools, cutting tools and gages for the company since that time.

Employed by Stewart & Stevenson

N. J. (Tiny) Herman

N. J. (Tiny) Herman has recently joined Stewart and Stevenson Services, Inc., as a power application engineer in the engine division of the Houston headquarters. Herman's work will be primarily in the development of industrial and oilfield applications for diesel power, a field in which he has had long experience. Wide service in industry and in oilfields, both in Texas and in the East, qualifies him easily for the duties of his new position with Stewart and Stevenson Services, one of the nation's largest distributors of General Motors diesels.

Diesel Engine Catalog now available in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 88.

Diesel Economy Cuts Debt

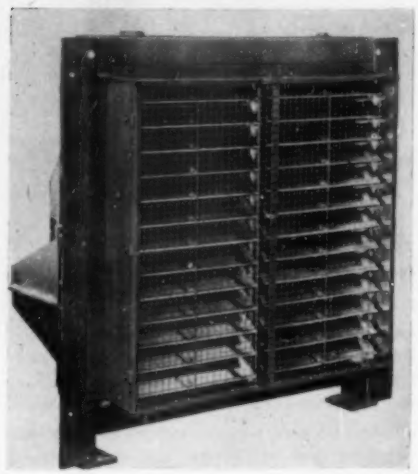
The purchase of diesel driven locomotives proves to be seven times more economical to the equivalant amount used to reduce funded debt, most railroads admitted in a report recently. A director of one prominent railroad system explained why it is thriftier to buy new diesel locomotives rather than reduce debt. An investment of $10,000,000 in bond retirement saves $400,000 a year in interest. The same amount used to buy diesels can save $2,500,000 to $5,000,000 a year, depending on the number of hours the diesels are in use.

The Electro-Motive Division of General Motors came up with some impressive figures as a result of a study of diesel drive in the railroad industry. In some extreme cases the return on money invested in diesels has been 50 per cent. In most instances it ranges from 25 to 35 per cent where close to maximum use made of locomotives.

Vice President of Hunt-Spiller

A. J. Edgar, general manager of Hunt-Spiller Mfg. Corp., Boston, producers of railroad, marine and stationary diesel castings, has been elected a vice president, Neil C. Raymond, president of the 140-year-old foundry, has announced.

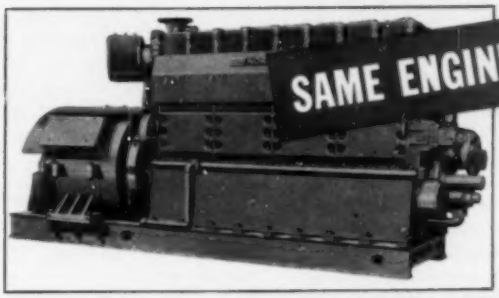
New Design for Cooling Radiator

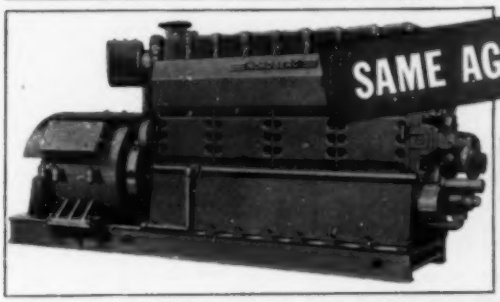


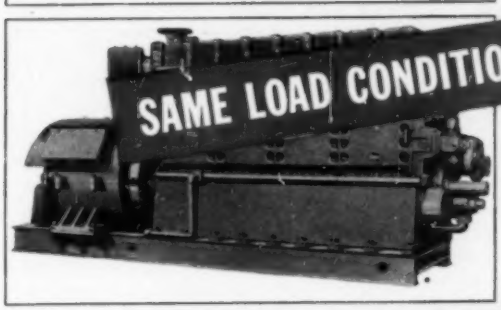
New design details for jacket water cooling radiators have just been incorporated into special Monoweld radiators by Young Radiator Company, general offices Racine, Wisconsin, with plants at Racine, Wisconsin, and Mattoon, Illinois. This unit, designed to meet the customer's special requirements, provided the answers to required difficult problems. Basically, the radiator is one of Young's line of Monoweld radiators. However, by the use of special types of metals, the unit is practically corrosion resistant. For this particular job, the units will operate in varying types of weather conditions, and as no one radiator can be earmarked for any one climate or place, it was important that these features be built into each radiator. All major ferous parts are zinc plated. The nuts, bolts, screws and washers are cadmium plated. The natural corrosion resistance of copper, brass and aluminum protect the actual core and cooling parts of the unit. To further protect the radiators against corrosion, a priming coat of zinc chromate has been applied, this in turn is followed by a coat of gray enamel.

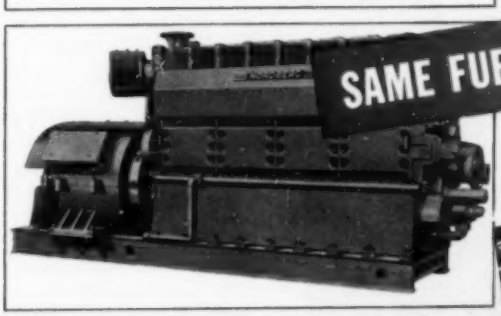
The radiator is designed to maintain a maximum jacket water temperature of 180°F. with a maximum of 120°F ambient air temperature. It will cool a 173-hp. diesel engine running at 720 rpm. driving a 100-kw. generator. Other construction details of the Monoweld fabricated steel tank radiator are: Welded steel tanks, side members and motor base supports. A copper front guard screen with 1-inch mesh, copper fan guard screen with 1-inch mesh. Aluminum fan shroud with aerodynamically designed venturi type opening for high air delivery with minimum resistance to air flow. A cast aluminum air foil fan developing high air delivery with low power consumption. Fan is mounted on output shaft of a 5-hp., 1,140-rpm. motor. Automatic gravity type aluminum shutters. The fan air blast opens shutter blades which remain open until fan stops, at which time the combined forces of gravity and the shutter blade unbalance, close the shutter blades tightly against each other. The radiator core is of an efficient, industrial type and is reinforced at strain areas for strength.

Diesel Engine Catalog now available in its Fourteenth Edition. ORDER COUPON ON PAGE 88.









Yet Lubrication is Different!

Yes, it's not unusual. From the first day in service, every engine begins to develop its own lubricant "diet." Frequently it's a matter of care and attention given by the operator. Often it's caused by geographic or climatic differences. Certainly, no two engines ever built performed identically . . . wore out at the same time . . . or required the same amount and kind of lubricant for best performance.

For these reasons *your* Diesel engine investment should be protected with regular lubrication engineering service. A Cities Service representative is highly skilled, highly trained and thoroughly familiar with the lubrication requirements of every type of Diesel equipment. Moreover, behind him stands an alert, completely integrated oil company with a full line of top quality industrial lubricants. Contact the office nearest you or write below for further information.

A Complete Line of Top Quality Petroleum Products Including:

- **New Heavy Duty Diesel Oils**
- **New Low Speed Diesel Oils**
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MODERNIZE YOUR DIESEL

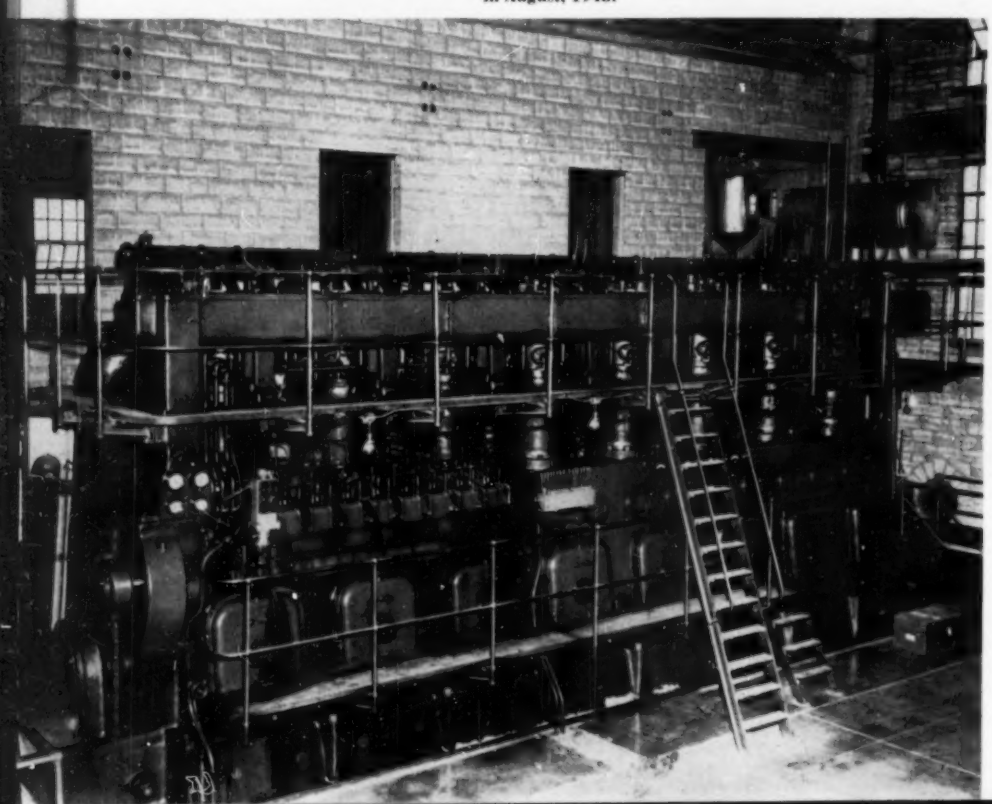
By O. F. COZIER

THE stubborn refusal of diesel engines to wear out and the equally stubborn refusal of the engineering profession to stand still creates a problem for the owners of old but mechanically sound engines. The development of the improved equipment has produced more desirable new engines just as has been the case in the automotive industry. Should the owner of an old automobile decide to take advantage of recent improvements it is a simple thing for him to roll the old one into a dealer's place of business and come out with the new. This is not so with the diesel engine. To replace the old with the new is a major operation. It is not difficult to find engines working around the clock doing the same job with the same reliability as when installed perhaps thirty years ago. There may be many things about this engine that do not measure up to modern standards. The owners of large numbers of engines have at times found it good business to modernize their engines. An example of this was shown when one of the major pipe line companies super-charged nearly all of their four-cycle engines. This was possible only because this company could spread the development costs over a great many engines and therefore not greatly affect the unit cost. To a single engine owner this cost would have been prohibitive. It is equally impractical for the engine builder to go back out into the field and bring all of the engines he has sold in the past up to date each time he develops and applies another idea to his new engines.

It has long been apparent that a valuable service could be rendered users of old engines if some organization would assemble the engineering know how and the mechanical ability to apply to old engines these modern developments. Thus the development costs could be shared by a number of owners instead of the individual. The dual-fuel engine was announced following the recent war when a sharp increase in fuel oil prices was taking place. Natural gas became more readily available and at pre-war prices. This combination of circumstances presented a situation whereby decided savings in fuel costs could be made by utilizing this cheap gas as fuel. This in many cases was possible and practical by making a dual-fuel engine out of the old conventional diesel. Here some organization was needed to modernize the old diesel engines in the field, and Diesel Modification, Inc., was organized for this purpose.

John L. Berggren, president of the corporation, has spent many years in connection with the diesel engine industry. He spent two years in the Busch-Sulzer shops and one year at sea as test engineer for their marine type engines. For ten years he was a power plant superintendent. He also spent ten years with the American Locomotive Co., Diesel Engine Division, which included two years as guarantee engineer on mine sweepers and other naval craft in the Pacific. Mr. Berggren's assistant and vice-president, Otis F. Trickett, has had 22 years experience with two of the major pipe line companies in maintenance and installations of many different makes and types of diesel engines and pumping equipment. Four years of this period he was assistant master mechanic for the Stanolind Pipe Line Company.

This 1,600-hp. model VB De La Vergne located in a city power plant at Russell, Kansas, was converted to dual fuel in August, 1948.



The first conversion was made for the City of Homer, Louisiana, on a 730-hp. solid injection, naturally aspirated engine. It is believed that this was the first attempt at a conversion in the field, at least for municipalities. Immediately following the conversion the engine showed startling savings. This saving later proved to be around $1,000 per month, with approximately a 50 per cent load factor. It was also soon learned that the oil filter elements normally lasting one month kept the oil clean for five months. Valve grinding became considerably less. It was obvious that maintenance cost in general would be substantially reduced. The next conversion was an 875-hp. solid injection engine for the Missouri Public Service Company at Nevada, Missouri, completed in March, 1948. Here parallel operation with the company's system caused some complications, which were satisfactorily overcome. These two conversions proved beyond doubt the wisdom of the venture, and other jobs followed in rapid succession. Today Diesel Modification, Inc., has some 12,000 hp. of conversions in operation, and several more engines under contract.

In one case a 400-hp 26-year-old engine was on a cracked foundation. The owners had decided that it was not worth the cost and effort involved to put it back into service. The possibilities of dual-fuel presented a different picture. A new foundation was built and the engine moved onto it. During this operation it was given a thorough overhaul and made dual-fuel. Today it is operating full time and at efficiencies both as to gas consumption and pilot oil requirements equal to that expected of any new modern dual-fuel engine. The investment has been more than justified. Cushing, Oklahoma, converted their entire plant of four engines, totaling 3,420 hp. These were completed in November, 1948, and operation to date has been highly satisfactory. Aside from lower fuel cost, savings in maintenance has been substantial.

The largest engine converted thus far is the 1,600-hp. engine shown in the illustration. In this conversion the mechanical governor was replaced with a Woodward UG 32. This engine in regular operation is using 12 per cent pilot oil and 10,850 btu. total heat consumption per kwh. at 900 kw. load. Another notable conversion is a 450-hp. air injection engine in the municipal power plant at Homer, Louisiana. Here again Homer is believed to be a FIRST in having a successful air injection engine operating as dual-fuel. Satisfactory continuous operation is experienced with 20 per cent pilot oil.

A fully automatic control system invented and patented by Mr. Berggren has been applied to all

of the engines converted. If the gas supply fails, the engine changes to full oil operation and will carry its full rating as an oil engine. With the restoration of the gas supply the engine automatically goes on dual-fuel again. Should a severe overload be accidentally put on the engine the gas supply is shut off and the engine will operate on oil only until the load drops to within its rating, when it will return to operation as in normal dual-fuel engines. The maximum normal requirement of gas is pre-determined and the controls so set that more than this amount cannot get into the engine. After this amount is reached and the governor continues to move toward increased fuel, the gas is diminished and oil substituted until a point is reached where no gas and 100 per cent oil is furnished. This precludes severe detonation which would otherwise occur. The governor is so connected that it can cut off all of the oil being furnished by the fuel pump, but when the pumps are moved into a position where a safe amount of pilot oil is not furnished a quick closing spring loaded valve in the gas line trips shut. This also occurs if the over speed stop functions, when stopping the engine or if the governor should override on a sudden release of load. Failure of the pilot oil supply also automatically shuts off the gas. It is possible with this system to start and stop the engine without shutting off the gas manually, since no gas can get into the engine until normal speed is attained. At this point the governor automatically admits the proper amount of gas and backs down the fuel pumps to the proper amount of pilot oil. When developing this system special emphasis was put on safety. A careful study was made of all the conditions and combinations thereof that could occur sometimes among a large number of widely scattered engines and provisions were made to take care of such irregularities automatically. A number of such anticipated irregularities have already occurred and have been nicely handled by the system. Simple, trouble free, and safe operation has been the primary objective at all times. Economics have been a secondary consideration, but in all cases the conversion systems have paid for themselves in a matter of months. While work of other nature has been done, it is apparent that the existence of Diesel Modification, Inc., is justified by dual-fuel conversions alone.

Did You See This?

Publishers, wisely or otherwise, generally refrain from over-emphasis of competitive claims and by the same token, they avoid, at least try to avoid, derogatory comment. Always the objective approach—nearly always.

But the following appeared in a news item entitled "New Unique Heater" on page 83 of the April issue of Diesel Progress—inadvertently, most inadvertently—"Its stability is further enhanced by its electrical troubles."—and we were supposed to be describing, objectively, a new locomotive cab heater by Kysor Heater Company. The point, and may we be permitted to say a good one, is clearly defined in the correct version, which reads: "Its stability is further enhanced by its electrical terminal blocks and protective conduit that almost completely eliminated electrical troubles." That puts it mildly enough and convinces us that Kysor has got a good locomotive cab heater.

Diesel-Driven Fishing Craft

Ready for the worst that Lake Superior fishing can bring, the *Valpuri* was recently launched at Hancock, Michigan. Designed by Henry Koski, she was built by the Portage Lake Machine and Mfg. Co. for Mr. Urho Keranen, of Ontonagon. The *Valpuri* is 40 feet long, has a 12-foot beam and 42-inch draft. Her heavy weather design and sturdy all-steel construction will see her through years of rigorous service. Her power is a 6-cylinder General Motors diesel engine equipped with a 2:1 reduction hydraulic gear and driving a 32x18-inch propeller. At a normal cruising speed of 10 mph., her 235-gallon fuel tank will supply her for almost 70 hours operation. Her top speed is 12 mph. Mr. Keranen was particularly pleased with the *Valpuri's* performance this winter when she went through 5 to 7 inches of ice while towing another boat.

140th Anniversary for Hunt-Spiller

The nation's second oldest producer of iron castings, the "gun iron" foundry of Hunt-Spiller Mfg. Corp., South Boston, is observing its 140th anniversary. Established in 1810 by Cyrus Alger, a native of Bridgewater, Mass., the foundry, Massachusetts' oldest, became one of America's leading ordnance producers before it began manufacture, late in the '70's, of marine, railroad, and industrial castings. By 1930, thirty-eight years after its reorganization as Hunt-Spiller, the South Boston works had iron in service on practically all the country's railroads and on ships throughout the world. Diesel castings production was started on the basis of the foundry's experience with wear-resistant steam engine components. As its diesel volume grew two large additions to plant were made to cast and machine liners, heads, piston rings, jackets, and other parts for marine and stationary service diesels. That experience, in turn, put Hunt-Spiller in a position to extend its service to manufacturers and users of diesel locomotives. Now in a 10-acre plant, not far from its original site, the one-time ordnance foundry, which had molded the first rifled iron cannon cast in this country, is pouring both iron and steel for all forms of transportation and shaping an endless variety of castings for industrial use.

Diesel Engine Catalog now available in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 88.

Market New Fuel in "Throwaway" Can

A self-pressurizing fuel for flame tools and small appliances, packaged in a seamless throw-away container much the same in size as an ordinary beer can, has been perfected and is now being introduced by Pressure Products Corporation. The new fuel is called "Prepo" by its inventor, Louis A. Falligant, president of the company. In announcing the new fuel Falligant also announced the first of a series of tools and appliances that are being designed to be used with the new "Prepo" fuel. The first tool is the "Prepo" hand torch, which lights instantly, without pouring, pumping or priming and burns with a clean, blue flame of more than 2,200 degrees. Burner attachments fit onto the can to handle different applications. One burner tip throws a long, broad flame for work where a great deal of heat is needed in a hurry. Another smaller tip has a long, pinpoint jet for jobs that call for concentrations of heat in small areas.

Appointment at Vellumoid

Thomas G. O'Neil

The Vellumoid Company, of Worcester, Massachusetts, announceed that as of April 1, 1950, Thomas G. O'Neil was appointed general sales manager. After graduating from Harvard, O'Neil joined the sales force of the company in 1932. Except for 3½ years during the war, when he served in the Pacific as Lieutenant Commander in Naval Air Combat Intelligence, he has been with the company ever since. Mr. C. S. Livingstone, who has handled the sales of the company for many years, will continue as vice president and director of The Vellumoid Company.

St. Louis Railroad Diesel Club

The St. Louis Railroad Diesel Club, a year-old organization, has been originated for the purpose of holding meetings of instruction on operations and maintenance problems for diesel locomotives and their appurtenances. The Club is designed so that the mechanics and their immediate supervisions participate in the operation of the Club. Meetings are held once a month and at each meeting some prominent personality in the railroad diesel field is a guest speaker. The April meeting was enhanced by George A. Mueller, Lima-Hamilton Corporation, who gave two papers: "The Free Piston Gas Generator" and "Lima-Hamilton 1,200 HP. Diesel Switching Locomotive." This worthwhile organization is a definite asset to the members who are associated with diesel propulsions in the railroad industry.

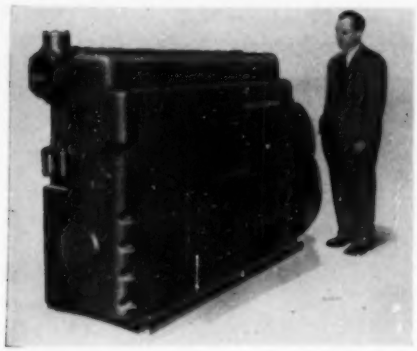
Improved Crankcase Oil for Diesel Engines

An improved crankcase oil for diesel and gasoline engines, which will combat sludge and engine deposits under severe operating conditions, even when used with fuels containing up to one per cent sulphur, has been announced by the D-A Lubricant Company, Inc., Indianapolis, Indiana, specialists in heavy-duty lubricants. This improved oil, with its greater dispersant action, is reported to give far greater engine protection than ordinary heavy-duty oils. In engines operating under continuous severe loading sludge formations are substantially reduced. Among the advantages obtained by using the improved oil are these:

1. Prevents ring sticking, valve and rocker arm deposits and excessive liner wear when high sulphur fuels are used. 2. Prevents cold engine sludge in stop-and-go operations as experienced in delivery fleets. 3. Prevents rust and moisture corrosion in engines that are idle or in storage. 4. The alkaline factor neutralizes the corrosive acids of combustion and results in reduced ring and liner wear in all types of diesel, gasoline and butane engines. This factor extends the normal overhaul periods.

Complete information about this improved crankcase oil may be obtained by writing the D-A Lubricant Company, Inc., Indianapolis, Indiana.

New Ingersoll-Rand Diesel



A completely new type of diesel engine, in the 195-375 hp. range, has been announced by the Ingersoll-Rand Company. According to the manufacturer, the diesel can easily be made portable, but is not automotive-type; it is small in size; light in weight, but with moderate speed; powerful, but with low exhaust temperature; perfectly balanced, but with no balancing devices. It is a 4-cycle, 7-inch bore, 8½-inch stroke, single-acting engine with a weight of about 30 lbs. per hp., and a fuel consumption of 0.40 lbs. per hp.-hr.

This new diesel, in addition to design features of its own, includes many important design features which have heretofore been available only in much larger stationary units. Cylinders are provided with replaceable, wet-type liners and individual heads with overhead valves and intake and exhaust valve-seat inserts. The thick-wall, long-skirt pistons are of aluminum alloy, with ventilated oil-scraper rings above and below the full-floating piston pins. The perfectly balanced crankshaft is short and unusually strong, with a 5¼-inch diameter at both crankpin and main bearings, eliminating torsional vibration without the use of dampers. Both the main and crankpin bearings are provided with aluminum alloy, full-floating, interchangeable shells. The camshaft, blower, water pump and lubricating oil pump are all gear-driven from the flywheel end of the machine, permitting power take-off from either end. Individual fuel injection pumps serve each cylinder, with two, single-hole, non-clogging nozzles per cylinder. The engine is full-pressure lubricated throughout and is equipped with a gear-driven mechanical supercharger which supplies air for increasing initial pressure in the cylinders and for scavenging during the latter part of the exhaust stroke.

Normal starting is by 250-psi. air admitted to all cylinders in turn through a starting-air distributor. Other methods of starting can also be furnished. The TS diesel is designed for mounting either on a simple concrete base, or on welded-steel skids where portability is desired. After more than two years of performance testing, the TS diesel is now in production, available in 6 or 8 in-line cylinder designs, capable of delivering 195 to 375 hp. at 900 to 1,000 rpm. For literature or additional information write File 9, Diesel Progress, P. O. Box 8458, Los Angeles 46, Calif.

To Represent Burgess-Manning Co.

Frank G. Walsh, Jr., of Atlanta, Ga., has been named Southeastern sales representative by the Burgess-Manning Company. Mr. Walsh will handle sales of Burgess-Manning exhaust "Snubbers," and other products in Alabama, Georgia, and North and South Carolina. Burgess-Manning products are extensively used in public utility plants, railroads, textile and paper mills, steel plants and other industrial establishments. Mr. Walsh spent ten years with the sales engineering departments of the diesel engine division of the American Locomotive Company, seven of them in the Southeastern states.

Engineering Assistant to Koppers Division Manager

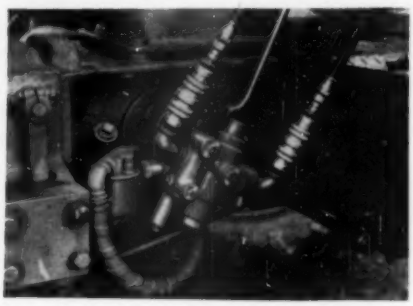
Earl V. Harlow has been appointed engineering assistant to Walter F. Perkins, Vice President and General Manager of the Metal Products Division of Koppers Company, Inc., Mr. Perkins announced recently. Formerly associated with Koppers central research department, Mr. Harlow in his new assignment will be responsible for assisting and advising the division general manager on engineering matters, and for coordinating research and development projects between the division and the research department. Mr. Harlow joined Koppers as a draftsman in 1926 and two years later became associated with the company's research department. From 1942 to 1946 he was chief process engineer at the Kobuta styrene and butadiene plant which Koppers built and operated for the U. S. Office of Rubber Reserve. Since 1946 Mr. Harlow has been engaged in research activities at the Seaboard experimental station of the research department in Kearny, N. J.

Vice President and General Manager at Enterprise

Paul I. Birchard

Appointment of Paul I. Birchard as vice president and general manager of Enterprise Engine & Foundry Company, has been announced by the company at its San Francisco headquarters. Birchard has been identified with the diesel engine industry for over 20 years, and has been associated with Enterprise since early in 1946. During the last war, Birchard served as a Navy Commander in charge of a Midwest Navy shipyard. It was following this duty that he joined Enterprise as assistant to the executive vice president. In the same year he became head of production at Enterprise's South San Francisco plant, and subsequently general works manager. Since January, 1948, he has been vice president in charge of engineering and manufacturing.

Sheppard Produces New Hydraulic System



A new independent hydraulic system has been produced by the R. H. Sheppard Company, of Hanover, Pa., for use with the complete line of full diesel farm, orchard and industrial tractors manufactured by that organization. The new Sheppard Independent Hydraulic System is mounted on the side of the pulley gear case of the tractor, it utilizes the lubricating oil contained in the gear case to operate the hydraulic system. This arrangement eliminates the necessity of extra storage tanks or oil reservoirs which are normally required by conventional hydraulic systems. The simplified finger-tip control mechanism of the new Sheppard hydraulic system is mounted at steering wheel level and to the left of the steering column for convenience and ease of operation. The Sheppard Hydraulic System has been designed to handle all present farm implements, as well as those which may be brought out in the foreseeable future. It is a precision, quality-built mechanism incorporating features to meet the requirements of modern farm operations.

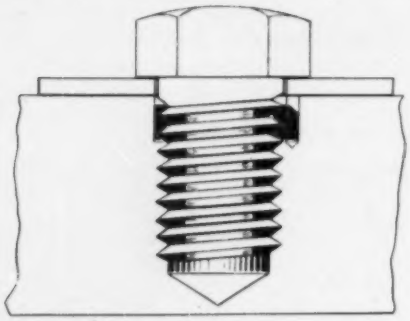
TWO NEW DIESEL LIGHT SHIPS

By GEORGE D. CROSSLEY

NEARING completion at the Rice Bros. yard in East Boothbay, Maine, are two new all-steel light vessels for the U. S. Coast Guard. The keels for these two vessels were laid in April, 1949, since when more than one hundrey fifty men have been employed steadily on the construction, which has proceeded quite satisfactorily. The date for actual completion of the vessels is not definitely set, nor has their destination been announced. These new light vessels represent great advances over similar types of ships built prior to the war and they embody the latest developments in design of ships of this type. The two new ships, designated as the WAL-604 and the WAL-605, are sister ships of the famous Diamond Shoals lightship, and like her they will be powered with diesel engines. They will carry complete radar gear and are designed for a crew of sixteen enlisted men and one officer. The main propulsion engine on each of these ships is an Atlas eight cylinder, direct reversing, air-starting, turbo-charged diesel of 570 brake hp. at 750 rpm. driving through a reduction gear to the propeller-shaft, which will turn at 276 rpm. The generating machinery will consist of three Cummins diesel generator sets of 60 kw. each. Each vessel will carry one hundred forty-seven tons of fuel oil, forty-four tons of water, one and one-half tons of lube oil and twelve tons of stores. Their overall length is 128 feet, beam 30 feet and designed draft 11 feet. Although unarmed, these ships have the general appearance of certain types of naval craft.

The Diamond Shoals lightship, sister ship of the WAL vessels.

New Security Studlocs



Eliptical spring steel retainers like those originally developed for Security locknuts have been applied successfully to the locking of studs, bolts and other threaded parts in mechanical assemblies by Security Locknut Corporation. In use, the stud or bolt forces the eliptical retainer into circular shape, creating rigid locking pressure on the threads. The stud or bolt may be adjusted to any position and will remain in position regardless of severe vibration. The retainer floats in a counterbore and carries no load. All tension or compression stress load on the stud or bolt is carried by threads in the tapped hole. The stud or bolt can be applied repeatedly without distortion to retainer or bolt. Initial assembly is simple, and in many cases costs less than conventional stud locking methods. Subsequent removals and reapplication require no further adjustment. Industry, government and independent laboratory tests have verified maintenance of locking torque on many applications, including cylinder head studs for gasoline and diesel engines, housing cover and flange studs, tappet adjustment screws, etc. Currently Security Studlocs are made in standard stud and bolt sizes from ¼-inch to 2-inch in both National Coarse (NC) and National Fine (NF) thread series. In addition, special sizes can be engineered to suit job requirements.

Appointment at Fairbanks-Morse

F. J. Heaslip O. O. Lewis

At a recent meeting of the board of directors of Fairbanks, Morse & Co., following their annual shareholders' meeting, two new vice presidents were elected. These are O. O. Lewis, vice president in charge of sales, and F. J. Heaslip, vice president in charge of purchases and traffic.

Both these men have been associated with Fairbanks, Morse & Co. for many years. Mr. Lewis joined the organization in 1908 as a clerk. For a number of years he was a sales engineer in Indiana, Ohio and Michigan territories.

Mr. Heaslip joined the company in 1927 as a buyer in the purchasing department. He was made purchasing agent in 1935 and director of purchases in 1942. He has been a director of the company for several years, and his election to the office of vice president in charge of purchases and traffic is a well earned tribute to his ability.

Improved Di-Phase Metal Cleaner

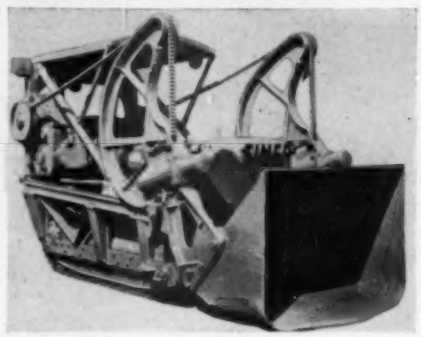
A new, simple method for making and using di-phase metal cleaners with very good detergency is based on having a system in which the water and solvent remain as separate layers. The solvent consists of a chlorinated solvent such as trichlorethylene to which is added mineral spirits to give a final specific gravity greater than the water layer which remains on top of the solvent. Phosphates are frequently added to the water to help clean water soluble dirt from the metals. Cleaning by this di-phase system is done simply by dipping the metal parts through the water layer into the solvent and then within a short time bringing them up through the water layer with a minimum of agitation or other mechanical cleaning methods. This system is not heated, thus avoiding difficulties with toxic fumes, fire hazard, loss of solvent and change in composition of the two phases. Samples of Polyethylene Glycol 400 (Di Tri) Ricinoleate S-556U are available from the manufacturer, Glyco Products Co., Inc., 26 Court St. Brooklyn 2, N. Y.

American Bosch Opens New Service Sales Division

With personnel in attendance from most of its sales and service agencies in the metropolitan area as well as from engine manufacturer and fleet operator customers, American Bosch held a formal opening of its new headquarters in New York, 601 West 51st Street. The modern two-story building at that location, which has just been completed, will house both the American Bosch branch office, formerly situated at 1819 Broadway, and the company's recently established New York service sales division. Offices occupy the second floor. The first floor is devoted entirely to mechanical service facilities for American Bosch products and to stockroom and counter space. According to Manager Joseph A. Foss, the New York service sales division has been established to handle both the sales and service of American Bosch automotive electrical and diesel fuel injection products in Manhattan and surrounding area comprising the Counties of Bronx, Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester in New York and the Counties of Fairfield, Middlesex and New Haven in Connecticut.

Donald P. Hess, President of American Bosch, company executives and directors, also including Joseph E. Ridder, Chairman of the Board; Herbert C. Guterman, President of Arma Corporation; and Foster N. Perry, American Bosch Vice President in Charge of Manufacturers Sales, were present at the opening.

New Diesel-Driven RockerShovel

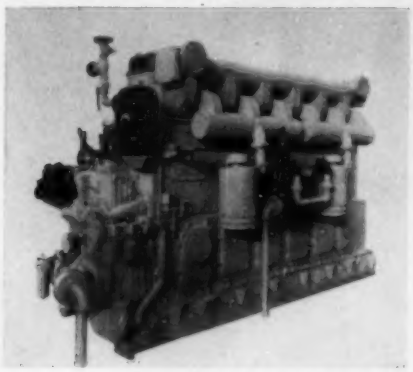


After years of field testing Eimco announces its new RockerShovel 104. This crawler RockerShovel was demonstrated to the group attending the Highway Engineering Conference in Salt Lake City the last week of March, for its first public demonstration. Loading wet sand and gravel at the rate of eight yards per minute, the 104 filled the 6-ton Dumptor in about 40 seconds. This 104 has a 48-hp. Caterpillar diesel engine and rolls its 2-yard gravel bucket overhead with ease in the mile high gravel pit just south of Salt Lake City. This machine is very versatile, as it can be used for loading or bulldozing. Its straight backward and forward motion eliminates the necessity of turning around to dump. Field tests have shown the 104 to be at least twice as fast as much larger conventional excavators that have many times the power. The RockerShovel is designed to dig and load blocky rock and abrasive ores in underground or surface operation. It is constructed of abrasion-resistant alloy-steel materials throughout. For heavy duty rock loading, the 104 is equipped with a 1¼-yard bucket. For additional information, write the Eimco Corporation, Salt Lake City 8, Utah.

Thirty-five Per Cent Dieselized

"More than 35 per cent" of the New York Central Railroad's locomotive mileage will be dieselized or electrified with receipt of new diesel-electric locomotives now on order, President Gustav Metzman announced to stockholders in the company's annual report. As the Central further progressed its equipment modernization program, its non-steam powered locomotive mileage was increased to an average of 28.7 per cent in 1949 from 21.0 per cent the previous year. The improvement was made possible by receipt of 167 new diesel-electric units for use on the Central, plus 82 for System affiliates. "Appreciable gains" likewise were achieved in passenger equipment, with receipt of 161 new streamlined cars, and in freight service, with delivery of 7,894 new freight cars to the Central.

Enterprise Spark Ignition Gas Engine



Six of these Enterprise GSG-6 engines, rated 360-hp. at 400 rpm., are in operation at the new San Diego sewage treatment plant. They have a 12-inch bore, 15-inch stroke, and a 6½ to 1 compression ratio. A low tension magneto is used, with dual ignition high tension coils—one for each spark plug—placed close to plugs for minimum circuit loss. The electrical system is completely shielded against sparking. Full safety protection is afforded through positive automatic safety valves which cut off gas supply in the event of low lube oil pressure, high jacket water temperature, low water level in vapor phase tank, or engine overspeed. In addition to efficient operation on sewage gas, these engines perform with equal efficiency on natural gas, propane-butane, or mixtures.

The editors wish to correct a statement made on page 33 of the May issue describing the San Diego sewage disposal plant. There are no fuel injection pumps on the six Enterprise sewage sludge gas engines installed at San Diego. This news item illustrates and briefly describes this engine correctly.

New Fuel Additive

The Lone Star Chemical Company has developed Texon, a diesel fuel additive which has proven to be highly successful in applications throughout the Southwest and in a large number of installations in Mexico. It is claimed that this diesel fuel additive makes foreign substances such as sulphur, resin, tar, gum, water, acids, etc., ever present in diesel fuel, combustible, by holding them in suspension in bubble form and burning them at the point of injection. It is further claimed that it maintains the rated horsepower of your engine due to better combustion; that you make substantial fuel saving by better combustion; that smoking is eliminated because there is no carbon, no waste and no smoke. They further claim that your engine will not suffer from stuck valves or rings if you will add Texon to your fuel supply; that you will have less pump and injector troubles; less downtime and that all metal parts will last longer because they will be kept free from corrosive matter.

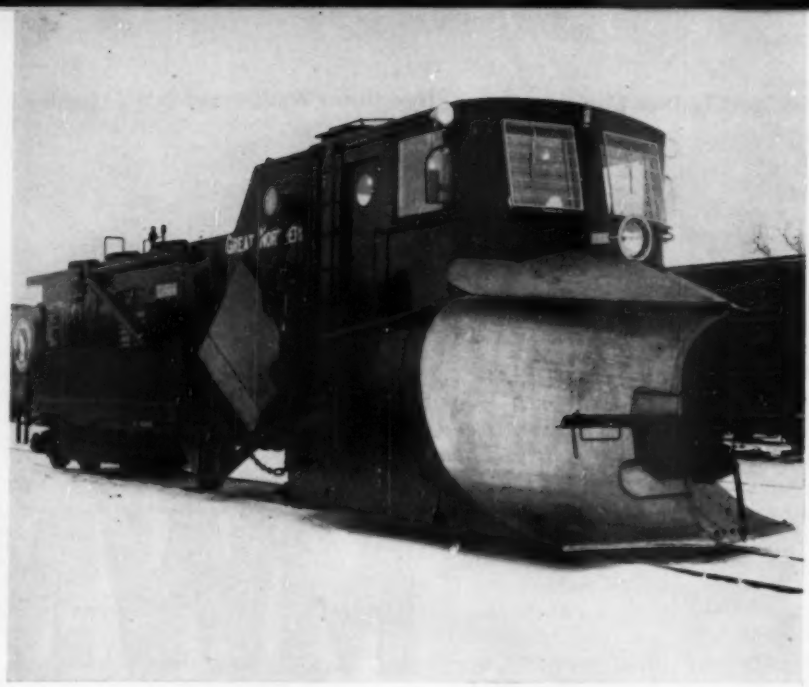
Further details on Texon, the diesel fuel additive, may be obtained by writing File 13, DIESEL PROGRESS, P. O. Box 8458, Los Angeles 46, California.

Diesel Engine Catalog now available in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 88.

New Utility Washing and Oiling Machine

A new utility washing and oiling machine for servicing viscous, impingement, panel-type air filters has just been announced by the Farr Company. The new washer and oiler is a modified version of previous models with a considerably lower cost. It is claimed that use of the washer and oiler reduces air filter maintenance costs as much as 67 per cent, substantially increases filter life, assures positive oiling, and permits lower inventory stock. The unit can be operated by one inexperienced man because all controls are automatic. The Far-Air Utility Filter Washer and Oiler accommodates filters up to 20x28x4 inches in sizes. Complete information, including specifications, installation and operating instructions, plus filter cleaning cost data, is available from the manufacturer.

GREAT NORTHERN BUILDS DOZERS

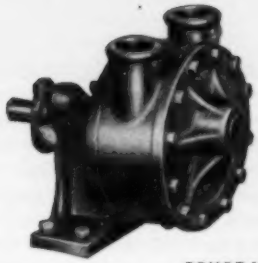


FOR the past thirty years, the Great Northern Railway has been developing and building most of its own snow fighting equipment. Construction of three snow-gravel dozers has just been completed at the railway's shops at St. Cloud, Minn. These dozers are unique in that all wings are operated pneumatically, and the machines are self-sufficient except for propulsion. The underframe, body framing, side sheathing and roof sheets are all welded. The trucks are 70-ton, of 5-foot 0-inch wheel base. The total weight is 140,800 lbs. The wheels are one wear steel.

The illustration shows the exterior of one of these dozers. The front plow can be raised approximately 6 inches above the rail by means of an 18-inch cylinder located in the nose and connected to the plow by a lever. The side portions of front plow are hinged to facilitate rerailing of front truck. The small side wing is operated by two 6-inch cylinders, one for the vertical movement of front edge, and the other at rear for horizontal movement of outward edge of wing by the changing of the pivot point of the wing brace. The large side wings ae moved vertically by means of two 10-inch cylinders. These wings are moved out from body by a cylinder connected to a lever that is fixed to the boom. The scraper blade is raised by a single 6-inch cylinder. The scraper is a standard motor grader mechanism, permitting the change of the angle between the blade and center of track and the angle of the blade with the vertical plane. The air compressor is a Gardner-Denver 6-cylinder, delivering 210 cfm. at 100 lbs., and driven by a Caterpillar diesel. The electric lighting is supplied by an Onan diesel driven 2,500-watt, 115-volt AC generator. A telephone communication system between cab of dozer and cab of pusher engine is provided.

The engine room is lined with steel and the cab with plywood. The cab is heated with an oil burning heater. All glass is laminated, and as shown, a screen is placed over front cab windows for protection. These dozers have now been delivered to the Cascade, Minot and Dakota Divisions, and in the short time in service have proved their superiority over those built previously.

designed for carefree performance...



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GENERAL PURPOSE PUMPS

• Low first cost • Negligible maintenance • Compact design • Operates dependably in either direction of rotation • Capacities to 200 g.p.m. • Pressures to 100 p.s.i. • Direct drive, slow-speed V-belt units and stripped models

Write for Model C bulletin.

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Promotes Rapid and Effective Servicing of *All* Makes of Diesel Nozzles and Injectors

All Diesel injection nozzles, due to the nature of their operation and the severe conditions to which they are subjected in service, require maintenance at regular intervals. That's why the need of nozzle cleaning and testing is emphasized in every Diesel builder's instructions.

The Bacharach Nozzle Tester provides a dependable means for checking nozzles accurately. Its low price — $79.00 — makes it a worthwhile investment for every Diesel operator and service shop. A complete line of connector fittings is available for American Bosch, Excello, Demco and Bendix nozzles; as well as GM 71 and Cummins unit injectors.

Ask your engine parts jobber to show you the Bacharach Nozzle Tester and our other Diesel testing instruments, or write for Bulletin 617.

BACHARACH Industrial Instrument Company
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This rugged tug is powered with model "P6" UNION Diesel engine, 6 cylinders, 12" bore x 15" stroke, naturally aspirated which continuously develops 400 horsepower at 390 revolutions per minute.

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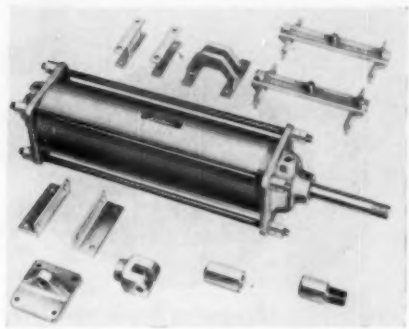
2200 EAST SEVENTH ST. OAKLAND, CALIF., U. S. A.

New AFCO Flareless Tube Fitting

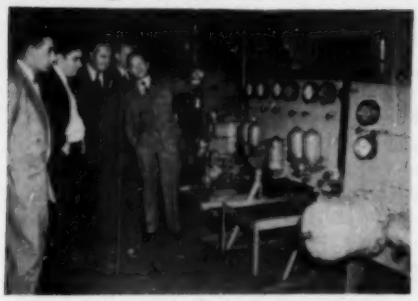
The Aircraft Fitting Company introduces new flareless tube fitting of improved design that eliminates tube gouging and limits tube distortion. The simplicity of the AFCO flareless fitting requires no tube flaring, permits quick economical installation without special tools and is ideally adaptable to close quarter connections. The gripping action of the fitting sleeve forms a positive leakproof seal and makes the fitting especially suitable for copper, steel, stainless steel, and aluminum tubing. The fitting is available in all standard shapes and sizes for tubing up to and including 1-inch O.D. Many special combination shapes and sizes up to and including 2 inches can be furnished. All shapes (elbows, tees, crosses, etc.), are machined from forgings—all other parts are machined from bar stock. "AFCO" fittings are used extensively not only in the aircraft field but every industry where fittings are required. For further information write DIESEL PROGRESS, File 17, P. O. Box 8458, Los Angeles 46, California.

New Hydraulic and Air Cylinders



A new line of air and hydraulic cylinders, known as the medium duty series, is announced by Ledeen Manufacturing Company. These cylinders are an addition to the line of heavy duty and super duty cylinders now being manufactured, which have found use in all industries wherever straight line motion is used; for remote control operation, material handling, clamping or holding, and a multitude of other uses. Cylinders utilize tie-rod construction to give positive protection against leakage at joint of tube and head. Chevron packing is used to seal piston rod. Synthetic cups and automatic cushion are standard construction. Like the heavy duty companion series, these cylinders feature manufacture to completely standardized design, and to be carried in stock for immediate shipment. Various head and rod attachments provide for almost universal mounting requirements. For information or literature, write DIESEL PROGRESS, File 19, P. O. Box 8458, Los Angeles 46.

Committee Meeting on Engine Lubricating Oil Filter



A cooperative committee of engineers working on the standardization of testing materials and methods for engine lubricating oil filters met at the U. S. Naval Engineering Experiment Station, Annapolis, Maryland, Thursday, April 27. The committee is composed of vice presidents of engineering, directors of research, chief engineers and project engineers of automotive engine builders, filter manufacturers and Government research agencies.

The laboratories of the member companies are conducting investigations and tests to develop testing materials, equipments, methods and procedures for evaluating the performance of engine lubricating oil filters. One of the major problems in this work is to find a suitable, standardized lubricating oil contaminant, that is, a dirt stock, for use in making filtering efficiency tests. Two natural contaminants consisting of carbon, abrasive materials, gums and resins, and other solid materials from used crankcase lubricating oils have been obtained and tested. One of these contaminants appears suitable and is available in sufficiently large quantity for the industry. Further tests on that material and on synthetic contaminants that are formulated to stimulate the natural contaminant are continuing.

The committee meets every few months to exchange test results and to discuss testing methods. The ultimate goal is to complete the development of and to establish standardized test material and methods for use by industry and government. The visiting group was conducted through several of the station's laboraties in the afternoon to inspect research and testing facilities, instruments and tests. The Internal Combustion Engine Laboratory was of particular interest to the engineers. Captain H. B. Dodge, I.C.E. Laboratory Officer, welcomed the group to the station. Mr. S. L. Earle, small diesel engine branch head, represents the station on the committee and made the arrangements for this meeting.

New Products by Standard Pressed Steel

Standard Pressed Steel Company announces the availability of three new products—Hallowell foremen's desks, made of steel described in bulletin 721; Hallowell stools and chairs, described in new bulletin 704; and Hallowell "700" steel platform trucks, described in bulletin 718. The new products are fully illustrated in each corresponding bulletin mentioned, giving full information as to features, how to order, etc. For additional data, write to the Standard Pressed Steel Company, Jenkintown, Pennsylvania.

New Diesel Service Company Formed

A new company has been formed in Cleveland to furnish fuel injector rebuilding and general service on General Motors Series 71 diesel engines. It is a partnership between Donald D. Fisher and Charles E. Silver, both of whom have had previous experience in the type of work for which they have launched this new enterprise. The company announces its ability to make immediate shipment of fully guaranteed rebuilt Series 71 fuel injectors of all regular outputs from ample stocks. This new company is the American Diesel Service, 7608 Lorain Avenue, Cleveland 2, Ohio.

Diesel Orders for Lima-Hamilton

During the first four months of 1950, Lima-Hamilton has received as many orders for diesel electric locomotives as during the whole of 1949. The 1950 orders to date total 46 locomotives, and include, in addition to previously announced orders for the New York Central and Cincinnati Union Terminal, orders for 1,200-hp. locomotives for the Erie, Nickel Plate, Wabash, New Haven, and a prominent steel company. One of the most satisfying aspects of these orders is that all but two have come from railroads which made their first purchase of Lima-Hamilton diesels in 1949.

Sales Up for Purolator

Sales of Purolator Products, Inc., were up 16 per cent in the first quarter of 1950 over average monthly sales for 1949, Ralph R. Layte, President, told stockholders at the annual meeting of the company at 20 Exchange Place, New York City. The gain was most pronounced in the company's line of automotive oil filters, marketed through jobbers and oil companies, Mr. Layte said, but was also evident in diesel, industrial aviation and other types of filter equipment manufactured by the company.

New Hand Tachometer

The Herman H. Sticht Co., Inc., has just developed a new hand tachometer of the single range type, the Model "JP," which is described in Bulletin No. 785. The Model "JP" tachometer was designed to be an instrument of high quality and accuracy, rugged and dependable, but to sell at an economy price. It is of small size, has a 3-inch dial and a long range, 400-4,800 rpm. It comes in a substantial velvet lined carrying case with tips. A feature of the instrument is the plastic lens, which prevents breakage and makes the instrument especially suitable for rough service work.

Vapor Steam Generators for Canadian Railroads

The Vapor Car Heating Company of Canada, Ltd., in Montreal, which is affiliated with Vapor Heating Corporation, Chicago, has just purchased a second plant in Montreal. This plant will be used to manufacture vapor steam generators for Canadian railroads. These are the machines installed in diesel locomotives to supply steam to heat passenger cars on diesel powered trains.

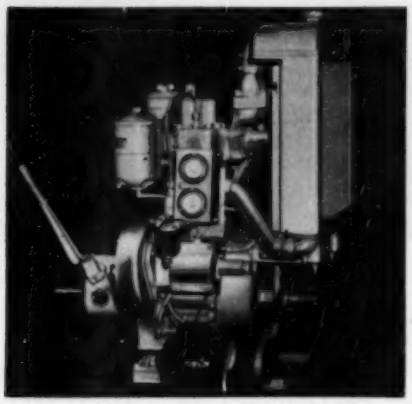
These remarkable machines develop 200 pounds steam pressure in two minutes from cold water and enough steam to heat a train. The ones installed in diesel locomotive demonstrating units now in use in Canada automatically make almost 5,000 pounds of steam an hour and enough steam to heat 100 five-room houses in zero weather. Water is pumped through a steel coil several hundred feet long, then hot gases from an atomized diesel oil fire turn almost 10 gallons of water into high pressure steam every minute.

Diesel Engine Catalog now available in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 88.

Diesel Order for Mack

In another step towards modernization of its bus fleet, Rochester (N. Y.) Transit Corporation has placed an order for twenty-five 45-passenger diesel buses with Mack Manufacturing Corporation. Designated as Model C-45, these Mack diesel buses incorporate many advanced design features, among which are the company's all-steel Fortress Frame, Mack's own 672 cu. in. diesel engine paired with a hydraulic converter, and the Mack Evenflow system which automatically controls heating and ventilation. All glass is non-shatterable.

Sheppard Announces Addition to Engine Line



Sheppard Diesels, Hanover, Pennsylvania, announce the addition of a new single-cylinder, water-cooled, diesel engine to their already extensive line of full diesel engines and farm tractors. Tests which the company has been conducting for the past year are now completed and the new diesel engine is ready for distribution. The new Sheppard diesel has been designated as Model 9, it is a 4-cycle, 1-cylinder, full diesel engine with a gross horsepower rating of 8.4 hp. and a continuous rating of 5.6 hp. The new diesel is available as a power unit or a 3-kw. generating set with radiator, heat exchanger, or tank cooling. Model 9 is extremely compact in design and it is anticipated that it will meet with acceptance for use in locations where weight must be kept down and space is at a premium. This diesel, like all Sheppard diesel engines, will operate on an amazingly wide variety of fuels. Moreover, it utilizes straight mineral base lubricating oils and does not require oil of the detergent type nor those which use additives.

New Instrument for Measuring Odd Frequencies

The Kato Engineering Company has made available a new bulletin describing an interesting instrument for measuring odd frequencies. In this day and age, many factories are finding it necessary to have a source of supply for experimental and production testing—a machine that will give odd frequencies such as 15 cycles, 25 cycles, 180 cycles, etc. This bulletin also describes the Katolight instrument which can be arranged to provide as many as six different frequencies. For further information write File 12, DIESEL PROGRESS, P. O. Box 8458, Los Angeles 46, Calif.

The following are manufacturers whose engines are fully described with tabulated specifications:

American Locomotive Co.
Atlas Imperial Diesel Engine Co.
Baldwin Locomotive Works
Buckeye Machine Co.
The Buda Engine Co.
Burmeister & Wain
Caterpillar Tractor Co.
Chicago Pneumatic Tool Co.
Clark Brothers Co., Inc.
Consolidated Diesel-Electric Corp.
Continental Motor Corp.
Cooper Bessemer Corp.
Crofton Diesel Engine Co., Inc.
Cummins Engine Co., Inc.
Enterprise Engine & Foundry Co.
Fairbanks, Morse & Co.
Flagship Engine Co.
Fulton Iron Works Co., Inc.
General Motors Corp.
Cleveland Diesel Engine Div.
Detroit Diesel Engine Div.
Electro-Motive Div.
Gray Marine Motor Co.
Hallett Manufacturing Co.
Harnischfeger Corp., P & H Diesel
Hercules Motors Corp.
Hill Diesel Engine Co., Div. of Drake America Corp.
Ingersoll-Rand Co.
International Harvester Co.
Kermath Manufacturing Co.
The Lathrop Engine Co.
Lima Hamilton Corp.
Lister-Blackstone, Inc.
Mack Manufacturing Corp.
Mechanical Equipment Co.
Murphy Diesel Co.
National Supply Co.
Nordberg Manufacturing Co.
Palmer Brothers Engines, Inc.
The Rathbun-Jones Engineering Co.
John Reiner & Co., Inc.
R. H. Sheppard Co.
Stewart & Stevenson Services, Inc.
Sun Shipbuilding & Drydock Co.
The Union Diesel Engine Co.
United States Motors Corp.
Venn Severin Machine Co.
Washington Iron Works
Waukesha Motor Co.
White-Roth Machine Co.
Witte Engine Works
Wolverine Motor Works, Inc.
Worthington Pump & Machinery Corp.

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IN NO OTHER BOOK can be found such complete and detailed information on diesel engines and accessories. Rewritten in its entirety while being brought up-to-date, great attention has been given to make Diesel Engine Catalog an easy-to-read book. Its unique chart showing Diesel Horsepower Ranges by manufacturer and its comprehensive classification and indexing, all contribute to making any item easy-to-find.

FIVE BOOKS IN ONE, HAVING FIVE INTEGRAL SECTIONS, this catalog is indispensable whether for technical reference or selective buying:

(a) An engine section fully illustrated with complete descriptions and specifications.

(b) An accessory section describing engine and plant accessories.

(c) A transmission section—a new feature in this volume.

(d) A classified buyers' guide—"Market Place," covering Diesels, accessories, transmissions and other allied products.

(e) A large advertising section. Manufacturers' advertisements carry a wealth of information for design and purchasing engineers.

DIESEL HORSEPOWER RANGE CHART: This catalog includes a new and startling chart showing horsepower range of diesel engines classified by manufacturer. By giving at a glance the range of horsepower ratings of the engines offered by each firm, it is a new and valuable aid to all connected with the Diesel Industry.

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Enter my order today for a copy of the 1949 Diesel Engine Catalog, Volume Fourteen, Edited by Rex W. Wadman, for which I enclose $10.00, also payable at £3-5s-0d. to E. H. Doddrell, 342 St. Paul's Corner, Ludgate Hill, London E.C.4.

NAME.....

ADDRESS.....

CITY..... ZONE..... STATE.....
(PLEASE PRINT)

Trane Develops New Fluid Cooler Line

Development of a complete line of 22 standard production dry type fluid coolers has been announced by The Trane Company, La Crosse, Wisconsin, manufacturers of air conditioning, heating and ventilating equipment. Used primarily for air-cooling engine jacket water and lubricating oil in diesel, gasoline and gas power plants, the dry type fluid coolers have many interesting special applications in chemical and petroleum processing; oil, gas and electrical transmissions; metal working and other industries. Each standard dry type fluid cooler consists of three principal parts:

1. The cooling core, or extended surface heat transfer coil, built up from non-ferrous fins and tubes, which contains the liquids to be cooled.

2. A specially-designed, balanced propeller fan that blows a large volume of cooling air across the coils.

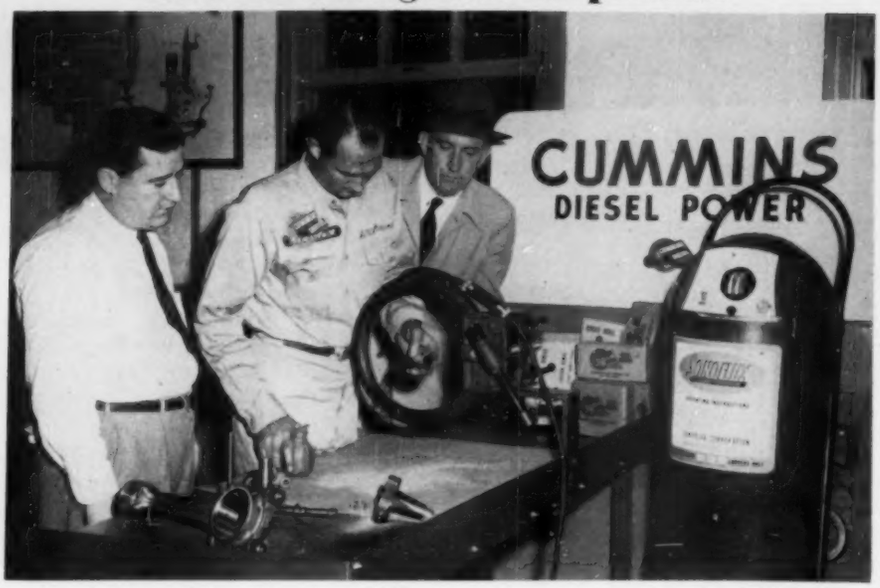
3. A heavy-duty casing built to withstand wind and weather.

Through simple combinations of coil circuits, one standard unit can dissipate heat from two or three different fluids, at different entering and leaving temperatures and different quantities of liquids. This feature is especially useful in stationary power plants, where one fluid cooler can cool both jacket water and lube oil, as well as helping dissipate exhaust fumes. In developing the new standard line, Trane engineers have drawn on their years of experience in estimating and testing performance of heat transfer coils, fans and pumps in heating, air conditioning and industrial process equipment.

Capacities of the 22 standardized units range from 66,250 to 7,630,000 Btu. (British thermal units) per hour. Weights range from 325 lbs. to 9¼ tons. The smallest standard unit, with an 18-inch, 1-hp. fan, will handle 2,200 cubic feet of air and a flow of 20 gallons of water per minute. The largest standard unit, with a 144.1, 34-hp. fan, will handle 220,000 cubic feet of air and a flow of 1,000 gallons of water per minute.

Complete data for selection, specification and installation of dry type fluid coolers is contained in a special 30-page Trane bulletin (DS-395).

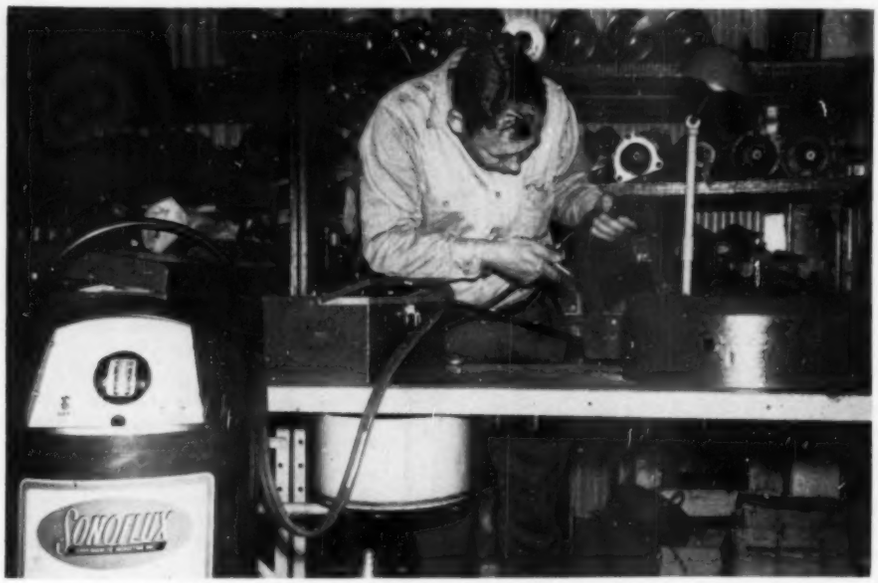
Sonoflux Magnetic Inspection



J. E. Everroad, President Cummins Sales and Service, Fort Worth; D. M. Peacock, Service Manager, Cummins; and R. L. Humphrey, Vice President and General Manager, Sonoflux Corporation.

INDUSTRY has been endeavoring to lower the cost of inspection methods due to the fact that inspection procedures involve non-productive labor. In many plants and shops throughout the varied industries where magnetic inspection is becoming more and more important and necessary, it has been either neglected entirely or minimized due to the expensive cost of existing inspection equipment or service. The demand for portable on-the-job magnetic inspection equipment became acute in the oilwell drilling industry in areas where failures in drill collars and drill pipe meant expensive down-time. To relieve this situation, a portable vibro-magnetic inspection unit was developed by the Sonoflux Corporation, making it possible to magnetically inspect at the drilling rig or in the field shops where the only source of power was 110-volt current. It was also found that the diesel engine industry paralleled the drilling industry for a need for this type of equipment for the magnetic inspection of crankshafts and other critical parts. Another problem which was offset by this new equipment is that an experienced operator is not required to make effective accurate inspections.

Engine repair shops throughout the industry could not afford expensive equipment, therefore they were required through necessity to either send parts out to inspection stations or to forego inspections in order to speed up productive work. The installation of this new type portable equipment at the shop means that much time is saved, produc-



W. J. Hardesty, Service Manager, Sonoflux Corporation, Houston, Texas.

tion increased and better more dependable service is rendered to the customer. Although crankshafts have been the major concern from the standpoint of inspection, it has been determined that the inspection of engine heads, injectors, pistons, rods, camshafts, cam roller assemblies and other parts is of great importance. Many shops have been reluctant to use magnetic inspection on engine parts because of the difficulty arising from not completely de-magnetizing the part following inspection. The new Sonoflux unit, which operates on a vibration principle, magnetizes the article being inspected only while it is in the magnetic field. When the article is removed from the magnetic field, it retains no magnetization, and as a result cannot attract small particles that could damage the engine parts.

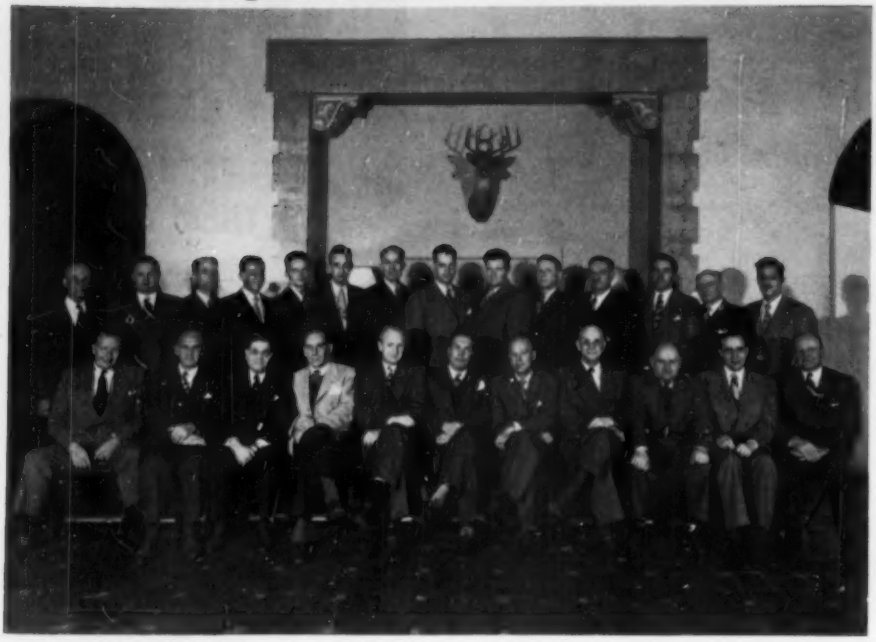
The Sonoflux unit weighs approximately 75 lbs., mounted on rubber tired wheels, and requires only 110-volt, 50-60-cycle current. To operate, the unit is plugged into the specified electrical outlet, and the article to be inspected is centered in the coil, or the probe is centered over the area to be inspected. Sono-Powder is sprayed on the article and blown off. The remaining powder outlines any break or fracture in the surface of the article being inspected and no magnetism is retained. The Sonoflux unit is equipped with a vibro-magnetic coil of 11½-inch I. D., suitable for crankshafts and small parts. An attachment is the Sono-Probe for engine heads and large or odd shaped parts. Sono-Powder is available in three colors, black, yellow and gray. For additional information write File 23, DIESEL PROGRESS, P. O. 8458, Los Angeles 46, California.

Feldmann to Head Worthington Sales

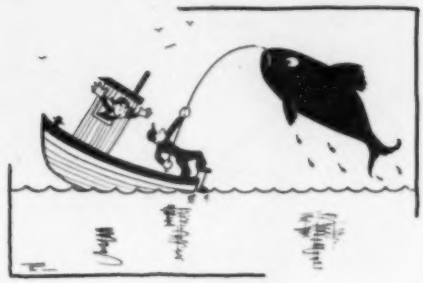
Walther H. Feldmann

H. C. Ramsey, President of Worthington Pump and Machinery Corporation, announced recently that Walther H. Feldmann, who has resigned as president of the corporation's subsidiary company, Electric Machinery Mfg. Company of Minneapolis, has been named vice president in charge of sales for Worthington, effective May 1. On the same date John J. Summersby will become vice president in charge of purchases; Frederic W. Thomas will become General Manager of Purchases; and Carleton Reynell, general representative, sales and purchasing departments. Mr. Feldmann graduated as an electrical engineer from the Baltimore Polytechnic Institute in 1915, and from the Westinghouse student course in 1917. He joined Electric Machinery Mfg. Co. in 1922, after having served as a power sales engineer with Consolidated Gas, Electric Light and Power Company of Baltimore. Advancing with E-M, he served successively as district manager, general sales manager, vice president and general manager until his election as president in 1944. Mr. Feldmann will make his headquarters at the Worthington executive offices in Harrison, N. J.

Enterprise Diesel Sales Meeting



Members of the Enterprise Diesel Engine sales organization from district offices throughout the country met with the San Francisco home office personnel at Sonoma Mission Inn, California, for their 3-day annual sales meeting, which was held in April. Those attending were (seated, left to right): G. C. Rasey, Sales Manager, Engine Division; J. S. Watson, General Sales Manager; G. B. Wright, District Manager, Chicago; P. K. Wabnig, District Manager, New Orleans; P. I. Birchard, Vice President and General Manager; W. E. Butts, President; J. W. Coombs, Member Board of Directors; W. H. Porter, District Manager, Seattle; J. H. Sheusner, Chief Engineer; H. T. Anderson, District Manager, New York; H. L. Hansen, Chief Service Engineer; (standing, left to light): T. S. Pennebaker, District Manager, Fort Worth; H. F. Neuman, Stationary Sales; M. T. Prendergast, Manager Service Parts; P. R. DeVos, Sales Engineer; S. F. Atsatt, Project Engineer; E. G. Harris, District Manager, Los Angeles; T. S. White, Technical Assistant; K. F. Cramer, District Manager, Kansas City; L. J. Robbins, District Manager, St. Louis; W. E. Bishop, District Manager, Washington, D. C.; J. N. Brophy, District Manager, Boston; H. J. Dauphinee, Export Sales; G. J. Brusher, Marine Sales; L. S. Noah, Advertising Manager.



22nd A. S. M. E. OIL AND GAS POWER CONFERENCE

Lord Baltimore Hotel, Baltimore, Maryland

COVERING current problems of operation and design as well as recent developments that will influence the internal combustion engines of the future, the 22nd National Oil and Gas Power Conference tentative program just released shows a wide variety of interesting papers. This meeting will take place June 12-16 at the Lord Baltimore Hotel, Baltimore, Maryland. Current problems to be discussed include corrosion, principles for foundation design for engines and compressors, analysis of exhaust process in four-stroke reciprocating engines, heavy fuels—how to handle, burn, and make them pay, and interesting inspection trips to the Baltimore Transit Company, B & O Railroad and U. S. Naval Experiment Station. A record number of engine and equipment manufacturers will display latest designs at the exhibit held in conjunction with the Conference.

All indications point to a large attendance at this important meeting, so arrange for hotel accommodations early.

PROGRAM

Monday, June 12

10:00 A.M. Executive Committee Meeting ..... *Chairman*: L. N. ROWLEY

12:30 P.M. Welcome Luncheon ..... *Chairman*: COL. L. G. SMITH
Speaker: W. PERKINS, Koppers Co.

2:00 P.M. Lecture—"Corrosion" ..... *Chairman*: JOHN GIBB

8:00 P.M. Lecture—"Corrosion" ..... *Chairman*: JOHN GIBB

Tuesday, June 13

9:30 A.M. Technical Session ..... *Chairman*: STUART NIXON
"Design Features of Nordberg Radial Engine"—EMIL GRIESHAEER, Nordberg Mfg. Co., and DON BOHN, Aluminum Co. of America

10:45 A.M. "Principles for Foundation Design for Engines and Compressors"—W. K. NEWCOMB, Ingersoll-Rand Co.

2:00 P.M. Technical Session ..... *Chairman*: BRIAN P. EMERSON
Marine Panel—"What Drive for Diesel Propulsion"

5:00 P.M. Social Hour

6:30 P.M. Banquet ..... *Toastmaster*: MARVIN SMITH
Speaker: ADMIRAL D. A. CLARK

Wednesday, June 14

9:30 A.M. Technical Session ..... *Chairman*: L. N. ROWLEY
Paper by Capt. C. G. Grimes

11:30 A.M. Inspection Trip ..... *Chairman*: J. A. WORTHINGTON, Koppers Company
U. S. Naval Experiment Station, Annapolis

Thursday, June 15

9:30 A.M. Technical Session ..... *Chairman*: K. W. STINSON
"Starting Requirements of Diesel Engines on Locomotives"—F. H. BREHOB, General Electric Company

10:45 A.M. Technical Session ..... *Chairman*: K. W. STINSON
"The Berry Hydraulic Transmission"—A. G. HOLMES, Mississippi State College, and O. D. M. VARNADO, Berry Motors Inc.

2:00 P.M. Technical Session ..... *Chairman*: E. CRANKSHAW
"Analysis of Exhaust Process in Four-Stroke Reciprocating Engines"—JOHN D. STANITZ, Lewis Flight Propulsion Lab., NACA

3:15 P.M. Technical Session ..... *Chairman*: E. CRANKSHAW
"The Future of Supercharging"—C. F. HARMS, Elliott Co.

8:00 P.M. General Technical Committee ..... *Chairman*: T. M. ROBIE
Discussion

Friday, June 16

9:30 A.M. Technical Session ..... *Chairman*: ROBERT CRAMER
"Heavy Fuels—How to Handle and Burn Them, Make Them Pay"
Inspection Trip—Baltimore Transit Co. and B & O Railroad—Koppers Company (by arrangement with MR. J. A. WORTHINGTON)

12:00 M. Executive Committee ..... *Chairman*: L. N. ROWLEY

WEST COAST DIESEL NEWS

By FRED M. BURT

THE Evans Engine & Equipment Co., Seattle, Northwest distributor for General Motors diesel engines, recently held a three-day session service school, with lectures in the Evans shop, aided by cutaway models of several engines, blowers, pumps, etc., from standard model GM engines, made available by the General Motors Mobile Training unit which has been touring the West for this purpose.

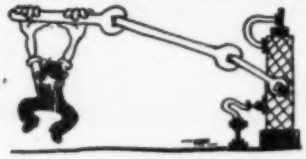
DIRECTED by O. E. Sette, headquarters in Honolulu, three diesel-powered exploratory vessels are conducting the Fish & Wildlife Service's "Pacific Oceanic Fishery Investigations"; converted 128-foot YMS's (to designs by Wilvers and De Fever) *Henry O'Malley* (560-hp. Union diesel) and *Hugh M. Smith*, aided by newly built, 87-foot purse seiner type, 300-hp., 6-cyl. Washington diesel.

IN order that contractors may not have to discontinue use of their "Caterpillar" D8 tractors for ten days or so, while their D13000 diesel engines are overhauled, Shepherd Tractor & Equipment Co., Los Angeles, is providing a new engine exchange service, enabling the D8's to go back to work within a day or two.

PURCHASED by Rexwroth & Rexwroth, Bakersfield, for use in their general contracting work, from International Harvester Farm Equipment Division, Los Angeles, 3 TD-24 crawler tractors, with 140-hp. I-H diesels.

POWERED by a 200-hp. General Motors diesel, 46-foot cruiser *Estrelita II*, of unusually heavy construction, at Glein Boat Works, Gig Harbor, Wash., designed by Monk & Garden, Seattle naval architects, for A. H. Molzan, Tacoma; power transmitted through a Walter transfer drive with 3:1 reduction at propeller.

TUNA clipper *Espirito Santo*, powered with a 560-hp. Union diesel, in its first 1950 trip, delivered to Van Camp in San Diego 508 tons of tuna, largest catch by any standard tuna clipper; Capt. Joe Machado's three-trip, 1,380-ton, 1949 catch, had the last trip shortened by 20 days through use of Pacific Helicopter's "Hiller 360" tuna scout, helicopter.



SUPPLIED and installed by San Pedro branch of Crofton Diesel Engine Co., GM distributors, 3-cyl. General Motors diesel with 3:1 GM hydraulic reduction gear, to re-power K-38 Albacore boat, *Two Sisters*, owned by Augustin Stagnaro.

THE NEW Pioneer Memorial Hospital, Brawley, Calif., under construction by F. E. Young Construction Co., San Diego, is being equipped with a diesel-electric, standby power and light unit composed of a G.E. 100-kw. generator, with Cummins NHIS 275-hp. diesel, and Synchro-Start unit for automatic starting if regular electric service is interrupted.

BURCH and Bebek, Los Angeles contractors, are re-powering a large Buckeye ditcher with a Caterpillar D-13000 diesel engine.

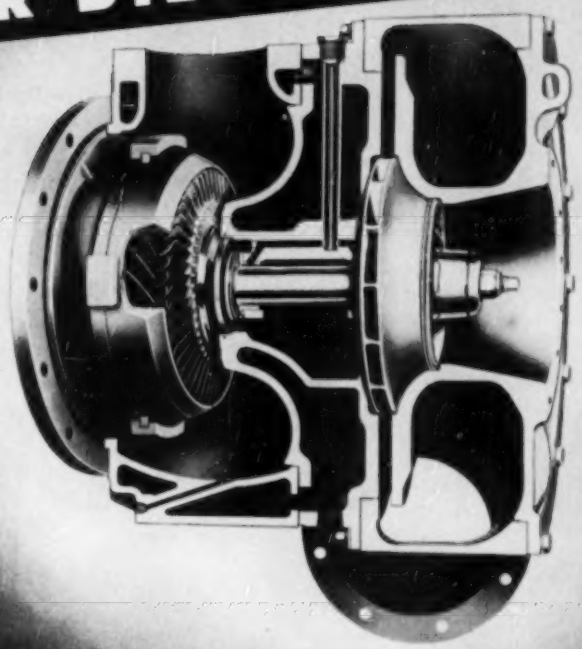
STARTING with sales to Los Angeles Transit Lines in 1946, 52 Allis-Chalmers HD-5G diesel tractors (powered with 2-cyl., 50-hp. G.M. diesel engines) equipped with TS-5 Tracto-Shovels, have been delivered to Southern California customers for minor earth-moving jobs by Shaw Sales & Service Co., Los Angeles, who are now supplying these units equipped with rippers attached to the rear end.

RECENTLY re-powered with twin 500-hp., model 8-268A GM diesels, 74-foot tug *Go Getter*, a converted LOA, has been added to the fleet of Bushre Tug & Barge Co., Ketchikan, Alaska, to tow crib rafts.

UNDER construction at yards of Anderson & Cristofani, San Francisco, designed by Jno. Martinolich, Sr., for Mariano Torrente, a new 65-foot purse seiner to be powered with a 265-hp. Enterprise diesel.

ADVERTISERS' INDEX

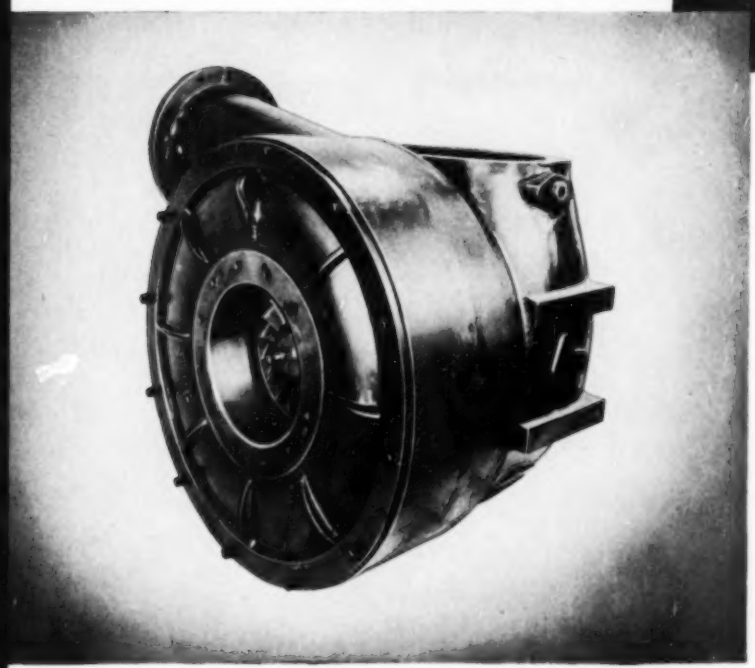
Another BOOST FOR DIESELS!



THE NEW

Elliott Turbocharger

TYPES L AND H



The new Elliott turbocharger is of simplified design, resulting in increased sturdiness.

With the experience gained in ten years of building thousands of turbochargers, Elliott engineers have developed and proved in service two new types of turbochargers, providing even greater added power than the former design, even greater assurance of continued operation, even greater savings in fuel, in lube oil, in maintenance.

With these distinct advantages, the new Elliott Turbocharger is . . .

- Driven by exhaust from the engine, with no mechanical connection, thus —
- Automatically adjusted to engine load —
- Rotating in one direction only, whether engine is going forward or reversing.

Type L, for low air pressure requirements. Type H for high air pressure service.

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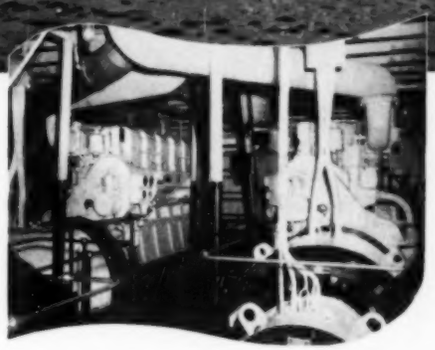
ALL COOPER-BESSEMER POWERED

for a 20-year-old reason!

The ferryboat "City of Norfolk", shown above in the middle background, went to work for Portsmouth-Norfolk County Ferries almost 20 years ago—their first diesel-electric, powered by two Cooper-Bessemers. These engines, still in constant 20-hour-a-day service, have long since set a record of diesel economy and availability seldom if ever equalled!

As a result, the "Great Bridge" (right background) was repowered with a pair of Cooper-Bessemers and has been showing comparable performance ever since. So it is easy to understand why the ferry system's latest vessels, the ultra-modern "City of Portsmouth" and "Norfolk County", are likewise Cooper-Bessemer powered.

It's the Cooper-Bessemer story once again . . . top-flight, low-cost diesel performance that bears repeating. Why not keep it in mind as you plan your next powering or repowering job?



Engine room of repowered motor ferry "Great Bridge", showing the two Cooper-Bessemer 580 horsepower diesel engines, each driving a 350 KW direct-current generator. The new 180 ft. "City of Portsmouth" and "Norfolk County" have similar power plants.

The Cooper-Bessemer Corporation

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